THE INFLUENCE OF CARING, CURIOSITY, AND KNOWLEDGE ON VISITORS' CONSERVATION INTENTIONS: AN EXPLORATORY INVESTIGATION AT THE TRACY AVIARY

by

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STATEMENT OF THESIS APPROVAL

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ABSTRACT

Rapid development and population growth challenges society to adopt behaviors that help conserve vital environmental resources. Zoos play an important role in this challenge because they receive millions of visitors annually and have opportunities to influence visitors' willingness to conserve important resources. Previous research in visitor outcomes has shown that after a zoo visit, people express intentions to engage in conservation actions, at least in the short term. I used Tracy Aviary's mission, "inspire curiosity and caring for birds and nature through education and conservation" to explore different variables that may influence visitors' conservation intentions. These variables were level of engagement, knowledge (objective and subjective), past visitation, curiosity, and conservation caring. Through three research questions, I sought to understand relationships among these variables, as well as identify the strongest predictor(s) for visitors' conservation intentions. I administered questionnaires to a sample of 609 visitors between June and July, 2015. Results indicate that caring was the strongest single predictor for visitors' conservation intentions (predicting 53% of the variance) and caring scores increased as a result of a single visit. Subjective knowledge (what people think they know) influenced curiosity and caring more than objective knowledge (what they actually know). Curiosity had the highest values pre- and postvisit among all predictors, but was not a strong predictor of visitors' conservation intentions.

Overall, these results provide points for discussion and can inform conservation education messaging, visitor outreach, and programming.

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In all, we were a great team.

CHAPTER 1

INTRODUCTION

Thesis Format

This thesis is written in an article format and encompasses three chapters describing the research I conducted at Tracy Aviary (Salt Lake City, Utah) regarding visitors' conservation intentions. It includes this introduction chapter (Chapter 1), an academic article (Chapter 2), a technical report for Tracy Aviary (Chapter 3), and my reflections on learning about the research process (Chapter 4). Chapter 2 has been prepared for submission to *Zoo Biology* and includes an introduction, literature review, research questions, site description, methods, analysis, results, discussion, and conclusion. Chapter 3 addresses information relevant to Tracy Aviary that was not described in Chapter 2. Chapter 4 describes my learning throughout the research process, beginning with conceptualization through the thesis defense. The Appendices include the survey administered to visitors (Appendix A), Tracy Aviary's map (Appendix B), comments to fee increase (Appendix C), general comments (Appendix D), and pictures of the setting (Appendix E).

Overall Research Question

The overarching goal of my thesis was to answer the following questions: **Does a single visit to Tracy Aviary influence visitors' conservation intentions, and what are the most salient predictors of visitors' conservation intentions?** To achieve this, I compared visitors, pre- and postvisit, and assessed a set variables that were hypothesized to potentially influence visitors' conservation intentions. These variables included visitors' level of engagement, their knowledge (objective and subjective), past use history, caring, and state-curiosity.

Overall Significance

Zoos and aquariums have the potential to move society towards conscious behaviors to reduce impacts on the environment (Rabb & Saunders, 2005; Saunders, 2003). My research expands the literature regarding the role of zoos in conservation by incorporating the constructs of 'curiosity' and 'caring' as relatively novel variables that could influence visitors' conservation intentions. Similarly, my thesis furthers the understanding of other known predictors of conservation intentions, such as visitors' knowledge (Falk & Alderman, 2003), by including subjective knowledge as a variable. Considering that engagement is a broad construct that poses some challenges according to Lewenstein (2015), I created a formative index to assess engagement using some of the activities offered at Tracy Aviary. I, in turn, explored how and if this index of engagement would influence visitors' conservation intentions.

This project was relevant because zoos (like Tracy Aviary) are conservation organizations that have the potential to influence visitors' opinions and behaviors in

relation to the environment (for a review, see Dierking, Burtnyk, Büchner, & Falk, 2002). In addition, because birds are usually an overlooked taxon in visitor studies (visitors' favorite animals tend to be the charismatic megafauna), this is one of the first studies to assess conservation intentions after visitors interact with birds at Tracy Aviary. Tracy Aviary is an accredited zoo in North America that holds birds exclusively, which presented an ideal laboratory for this investigation. Accreditation implies that zoos meet rigorous standards in veterinarian care, adequacy of exhibits, behavioral enrichment for captive animals, and overall, that the facilities are adequate for animals and the visitors. Importantly, it implies that zoos have impact in in situ and ex situ conservation as well as educational programs (AZA, 2014). According to the American Association of Zoos and Aquariums (AZA), there are approximately 10,000 accredited Zoos and Aquariums in the world. In the United States, only 9% of facilities that hold animal exhibits are accredited. (http://news.nationalgeographic.com/news/2003/11/1113_031113_zoorole.html).

The results of my thesis provides baseline information regarding Tracy Aviary's visitors, and reinforces the importance of 'caring' as a predictor of visitors' conservation intentions (Skibins & Powell, 2013), which has implications for Tracy Aviary specifically, but in general for all zoos. The Structural Regression Models (SRM) I used supported my hypothesis that 'caring' and 'curiosity' were related, and this relation needs further study since both 'curiosity' and 'caring' are central to Tracy Aviary's mission. My analyses also identified that visitors favored some conservation intentions (e.g., purchase products that do not harm birds, and make their yards friendly) over others.

CHAPTER 2

PREDICTORS OF VISITORS' CONSERVATION INTENTIONS AND THE IMPACT OF A SINGLE VISIT TO AN AVIARY

Abstract

Rapid development and population growth challenge society to adopt behaviors that help conserve vital environmental resources. Zoos play an important role in this challenge because they receive millions of visitors annually; according to AZA, North American accredited zoos attract 181 million visitors annually, which exceeds the combined attendance of football, basketball, baseball, and hockey (https://www.aza.org/visitor-demographics/). Considering this massive visitation, zoos have opportunities to influence visitors' willingness to conserve important resources.

Previous research in visitor outcomes has shown that after a visit, people express intentions to engage in conservation actions, at least in the short term. I used Tracy Aviary's mission, "inspire curiosity and caring for birds and nature through education and conservation" to explore different variables supported by literature that may influence visitors' conservation intentions. These variables were level of engagement, knowledge (objective and subjective), past visitation, curiosity, and conservation caring. Through three research questions, I intended to understand relations among these

variables, as well as identify the strongest predictor (s) for visitors' conservation intentions. I administered questionnaires to a sample of 607 visitors between June and July, 2015. Caring was the strongest single predictor for visitors' conservation intention (predicting 53% of the variance) and caring scores increased as a result of a single visit. Subjective knowledge (what people think they know) influenced curiosity and caring more than their objective knowledge (what they actually know). Curiosity had the highest values pre- and postvisit among all predictors, but was not a strong predictor of visitors' conservation intentions. Overall, these results provide points for discussion and can inform conservation education messaging, visitor outreach, and programming.

Introduction

The rate of development and population growth worldwide rapidly encroach on and negatively affect natural resources upon which humans rely (McKee, Sciulli, Fooce, & Waite, 2004). Consequently, modifying human behavior is needed to reduce impacts on the environment (Saunders, 2003). It is recognized that visits to zoos and aquariums have the capacity to influence visitors' understanding about conservation (for a review, see Dierking, Burtnyk, Büchner, & Falk, 2002). In this sense, Rabb and Saunders (2005) assert that zoos and aquariums have the potential to be drivers of societal change, and that in the long-term conservation journey, zoos play a pivotal role toward a more conscious and environmentally focused society.

In light of critical environmental problems and zoos' role in conservation, some zoos have undergone shifts to more intentionally address these environmental concerns (West & Dickie, 2007; Smith, Broad, & Weiler, 2008). To this end, zoos and aquariums

provide visitors with different education and conservation experiences to inform and influence their pro-environmental actions and decisions (Smith, Weiler, & Ham, 2011; Sterling, Lee & Wood, 2007). As an example of the nation-wide impact of accredited zoos in the United States, a study demonstrated that visitors are prompted to reevaluate their role in conservation action after a zoo visit (Falk et al., 2007). In addition, there is a volume of research documenting the extent to which zoos are effective in transferring information to visitors, and importantly, how zoos can influence visitors' attitudes, beliefs, intentions, and behaviors (e.g., Birjulin, Myers, & Saunders, 2004; Dierking et al. 2002; Falk & Aldeman, 2003).

The role of zoos as conservation education facilities becomes even more relevant when one considers the large visitation zoos receive. For example, zoos and aquariums around the world and the United States attract over 700 million and 181 million visitors, respectively, every year (AZA Zoo and Aquarium Statistics, 2014; World Association of Zoos and Aquariums, 2014). Understanding factors that influence visitors' conservation intentions during a single visit to zoos can help practitioners improve the role of zoos as 'centers of conservation caring' (Rabb & Saunders, 2005).

This research expands the literature about the role of zoos in conservation by incorporating curiosity as a relatively novel variable that could mediate the relationships between zoo visitation and conservation intentions. Similarly, this study furthers the understanding of other known predictors of conservation intentions, such as visitors' levels of conservation caring, and subjective and objective knowledge about birds. This study also explored the level of engagement of visitors during a zoo visit and if engagement influenced visitors' conservation intentions.

The site selected for this research was Tracy Aviary in Salt Lake City, Utah (U.S.A) as an accredited AZA facility showcasing living birds and exhibits with naturalistic designs. While many zoos have bird exhibits in the United States, there are only two zoos that specialize in birds, one of which is Tracy Aviary. The other facility mostly specialized in birds is the National Aviary. The size of Tracy Aviary (8.5-acres) made it a unique venue to study visitor outcomes born from close encounters with birds both in exhibits and freely roaming. Tracy Aviary is also an ideal site for this investigation because birds are usually overlooked in visitor studies, meaning that most other conservation-oriented zoo outcome studies focus on charismatic mammals such as elephants and gorillas (e.g., Skibins, Powell, & Hallo, 2013; Swanagan, 2000). Furthermore, previous investigations of this kind had not been conducted at Tracy Aviary, leaving its management with unanswered questions about the visitor characteristics, their experience, and outcomes of their visit.

I began this research with Tracy Aviary's mission, "inspire curiosity and caring for birds and nature through education and conservation" to assess if after a single visit, visitors' conservation intentions changed. To infer if conservation intentions (my dependent variable) varied, I used the following predictor variables: knowledge (subjective and objective), level of engagement, and past visitation history as independent variables, and caring and curiosity as mediator variables. The variables and their hypothesized relations are displayed in Figure 2.1. All these variables have been suggested in existing zoo literature as potentially influential on visitor outcomes, yet further understanding of these constructs is needed. Since curiosity and caring are central to Tracy Aviary's mission, this was an opportunity to fulfill both a gap in research and to

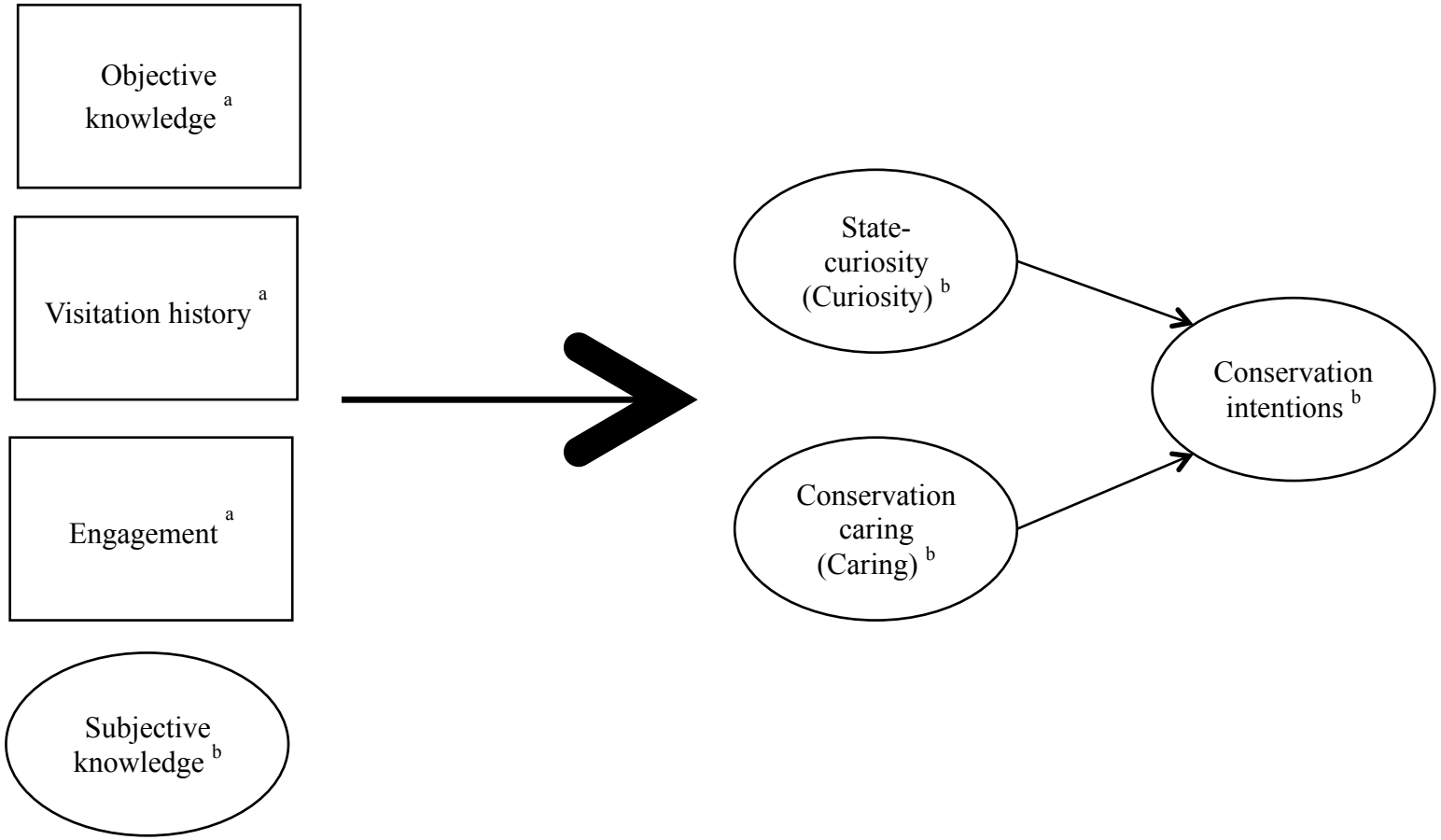


Figure 2.1. Conceptual model for testing the relationships between main constructs in study. [a] composite variable created from an equal unit-weight index; [b] latent variable reflected by numerous observed item

provide insights to Tracy Aviary's management. Specifically, the objectives of this study were 1) to determine if pre- and postmeans for curiosity, caring, and conservation intentions were significantly different after a single visit; 2) to assess if visitors' level of engagement, past visitation history, and knowledge (subjective and objective) influenced curiosity, caring, and conservation intentions; and 3) using these variables mentioned, to identify which were the best predictors for visitors' conservation intentions.

Literature Review

Research assessing the impact zoos have on visitors has been extensive, yet there is a need to further test variables that best predict the impact zoos have on visitors' conservation intentions. In this literature review, I provide a short summary of the role zoos have played in conservation. Next, I describe each of the variables that are used in this study, and hypothesized to be potentially influential of visitors' conservation intentions. The review concludes with a rationale for focusing on conservation intentions.

Zoos' Role in Conservation

A century ago, zoos were conceived as menageries that merely served as enjoyment for the public to appreciate exotic animals (Rabb, 2004); nowadays, with exceptions, several still operate like menageries. Various zoos in the United States and the world still do not meet adequate standards for animal care, and are not conservation oriented. Because of this, the impact of zoos on species conservation has been a topic of debate and research (Falk, Reinhard, Vernon, Bronnenkant, Deans, & Heimlich, 2007) and critics argue that zoos are centers for entertainment instead of conservation. In

response to these criticisms, zoos' role as conservation organizations and their commitment to conservation has evolved (Milstein, 2009). While the role of zoos as conservation organizations is undeniable, frequently visitors perceive them as leisure outlets; thus, it is zoos' responsibility to demonstrate that conservation is not just a discourse but their commitment. Therefore, zoo managers need to assess the influence of their facilities and programs on visitors' conservation actions and intentions (Clayton, Fraser, & Saunders, 2009); conservation ought to be their ultimate goal. If zoo managers recognize which variables most likely predict visitors' conservation intentions and offer activities on and off grounds that support these intentions, zoos impact in conservation could be more tangible.

Visitors' Knowledge

In the quest for predictors of visitors' conservation intentions, I used insights from the fields of tourism and consumer research, which have assessed consumer behaviors in the light of objective and subjective knowledge (e.g., Brucks, 1985; Carlson, Vincent, Hardesty, & Bearden, 2009; Taheri, Kafari & O'Gorman, 2014). Prior knowledge is defined as the knowledge accrued by a person through his or her lifetime, "the information stored in memory," and is also referred to as *objective knowledge* (Brucks, 1985, p. 1). *Subjective knowledge*, on the other hand, relates to what people think they know about a particular subject. Brucks (1985) and Carlson, Vincent, Hardesty, and Bearden (2009) suggest that subjective and objective knowledge may play different roles in decision-making and that subjective knowledge, in particular, may relate to the confidence to make decisions. Additionally, subjective knowledge is a stronger

motivation, for some behaviors, than objective knowledge (in Selnes & Gronhaug, 1986; Feick et al., 1992, as cited in Aertsens, Mondelaers, Werbeke, Buysse, & Van Huylenbroeck, 2010). Extrapolating this information to the zoos, I included both subjective and objective knowledge as independent variables in the hypothesized model (see Figure 2.1). Because visitors come to zoos with existing knowledge about birds (and their conservation), this knowledge may influence how visitors make conservation choices. However, I found no conservation-oriented zoo studies that compared the competing and synergistic influences of visitors' subjective and objective knowledge on conservation actions and intentions. Therefore, this study extends the literature by investigating the role of visitors' knowledge on their conservation intentions.

Level of Engagement

While different authors address engagement in informal settings (Gusset, Moss, & Jensen, 2014; Mann, Ballantyne, & Packer, 2014; Schwan, Grajal, & Lewalter, 2014; Wijterane, Van Dijk, Kirk-Brown, & Frost, 2014), there is a not a unified definition of the term. For example, Falk and Storksdieck (2005) use engagement to note visitors' interaction, in particular, with exhibits or interpretation signs at zoos. Mann, Ballantyne, and Packer (2014), incorporate the term reflective engagement that involves cognitive and affective components, but do not actually define it. In the tourism field, better engagement is synonym for a better experience (Taheri, Jafari, & O'Gorman, 2014), which also applies to zoos. Zoos aim to engage visitors to care about nature, and ultimately, to influence their behaviors towards it. Since one of the challenges zoos face is engaging their visitors (Skibins & Powell, 2013), a better understanding of engagement

and its influence on predictors of conservation intentions, like caring, may inform zoo managers about how their facilities could promote and maximize visitor outcomes.

Past Visitation History

Repeated visits to zoos seem to affect the way visitors build their knowledge, in addition to other activities done outside of zoos (Schwan, Grajal, & Lewalter, 2014). Experience-use history (EUH) captures this visit repetition and "can be measured through total number of previous visits to an area, total length of time visiting an area, and/or frequency of visitation to the area or similar areas" (Williams, Schreyer, & Knopf, 1990). This EUH variable has been used widely in park and protected area management. For example, McFarlane, Boxall, and Watson (1998) found a relation between visitors' past visitation history and the selection of sites in different Canadian wilderness areas. More experienced visitors were able to choose wilderness sites based on their experience with those sites. Extrapolating this rationale to the zoo context, one would think that frequent visitors to Tracy Aviary could use acquired information and experience from different visits to make decisions that benefit birds and their conservation.

Conservation Caring

Caring implies expressing concern for others (Rabb & Saunders, 2005), and according to Clayton and Myers (2009), care develops within social contexts that are facilitated by zoos and aquariums because of the opportunities for interaction with nature. It is well documented that animals produce connections with humans, and Gwyne (2007) suggests that generating emotional responses in visitors can help inspire them to

conserve. Also, since "caring itself is affect-based…, one is automatically in the land of emotion" (Gwyne, 2007, p. 57) and emotions are also thought to influence actions substantially (Braus, 2009). While all the dimensions of caring are not well understood, Rabb and Saunders (2005) suggest that conservation relies on people caring about and for animals and ecosystems (i.e., conservation caring). While the reasons to care are as varied as the context in which individuals develop, caring is a learned emotion that individuals incorporate as part of who they are (Clayton & Myers, 2009).

Caring comprises expressions of concern and it is thought to involve emotional, intellectual, and behavioral aspects (Rabb & Saunders, 2005). It has also been ascribed as an emotion, and zoos offer opportunities for a diversity of emotional experiences, including caring, that are caused by exposure to viewing animals (Birjulin, Myers, & Saunders, 2004).

If zoos address visitors' emotion and intellect, their role as 'centers of caring' may be heightened. Geller (1995) proposed that caring is a mediator between conservation behaviors and different needs of individuals. Deeping the understanding of caring will likely help zoos influence visitors' behaviors because caring is a known precursor of pro-environmental behaviors and what people care about in relation to nature is an important factor in models that evaluate behavior change (Perkins, 2010; Saunders, 2003; Skibins & Powell, 2013).

Different methods to instill a behavior include rewards to motivate the behavior change. However, evidence has proven that when these incentives are removed, the behaviors may dissipate. For this reason, rather than directing efforts toward external motivators, Geller (1995) proposes to target intrinsic factors, and caring is innate to

individuals given our social human nature (Taylor, 2002, as cited in Rabb & Saunders, 2005). Perkins (2010) tested a scale for love and care for nature and concluded that love and care were good predictors of people's disposition to make an effort to protect the environment. Similarly, Skibins and Powell (2013) found that conservation caring effectively predicted species oriented proconservation behaviors and researchers like Saunders (2003) have used caring as an important variable to determine behavior change.

Visitors' caring about birds in zoos has not been specifically assessed, even though 21% of the worlds' bird species are prone to extinction (Şekercioğlu, Daily, & Ehrlich, 2004). Additionally, caring is central to Tracy Aviary's mission, and birds are critically important to many ecological processes (Şekercioğlu, Daily, & Ehrlich, 2004).

In this study, I hypothesized that conservation caring is related to curiosity; as Baumgarten (2001) states, there is "an important connection between the virtue of curiosity and the virtue of caring; to care deeply about another requires a degree of knowledge, and both to care and to know demand the ability and desire to get outside oneself and engage with the world" (p. 4).

Curiosity

Curiosity is the desire to acquire new information, knowledge, and eventually, to seek sensory experiences (Berlyne, 1954; Kashdan, Rose, & Fincham, 2004; Litman, 2005; Reio, Petrosko, Wiswell, & Thongsukmag, 2006). The study of curiosity poses challenges because: 1) curiosity is not a one-dimensional construct (Langevin, 1971, as cited in Naylor, 1981), 2) there is no full consensus on the breadth of the construct, nor one single scale fully measures it; 3) it has been used interchangeably or has been

associated with intrinsic motivation and flow, which complicates its use; and 4) it has been assessed as the likelihood to take adventure risks or engage in uncertain situations, which in the case of my study is not applicable.

The bulk of scales to measure curiosity have been tested in academic settings (e.g., Kashdan, Rose, & Fincham, 2004; Litman, Collins, & Spielberg, 2005; Reio, Petrosko, Wiswell, & Thongsukmag, 2006). Therefore, one of the gaps in the study of curiosity is that the existing scales have not been used in informal learning venues such as zoos and aquariums. In addition, to my knowledge, the role of curiosity as a variable that could predict conservation intentions has not been explored, although Arnone, Small, Chauncey, and McKenna (2011) hypothesize that curiosity may be a strong driver of behavior. Exploring curiosity's influence on conservation intentions may have implications for program design, marketing campaigns, and on-site messaging.

Curiosity can be innate or generated by something external (Baumgarten, 2001). The type of curiosity I studied was state-curiosity (Naylor, 1981), which is the curiosity experienced at a particular moment in response to an arousing situation. In this case, the arousing situation was a visit to Tracy Aviary, which encompasses different activities with birds and staff. My interest was understanding what*,* or if after being exposed to birds at Tracy Aviary, visitors' curiosity would be influenced (state-curiosity); not why or how visitors are innately curious (trait-curiosity). Trait-curiosity is the innate capacity to experience curiosity in general, not necessarily in a particular situation (Loewenstein, 1994; Naylor, 1981).

Conservation Intentions

A behavioral intention is the probability that a person will perform a behavior (Fishbein & Ajzen, 1975). Intentions have been used as surrogates of behavior (Ajzen, 1991; Fishbein & Ajzen, 1975) because correlations between intentions and actual behaviors consistently exist (Heimlich & Ardoin, 2008; Vining & Ebreo, 2002). This makes sense because at the most basic level, one must intend to perform an action prior to enacting (Heimlich & Ardoin, 2008). Fishbein and Ajzen (1975) suggest that to accurately measure behavior through intentions, it is necessary to account for the instability of intentions over time and understand that a specific behavior likely occurs after other behaviors have preceded it, and also could be influenced by other people.

Intentions are logical surrogates for behavior because one of the drawbacks of measuring behavior is that one of the conditions (intentions must remain stable) of the Theory of Planned Behavior is violated (Ajzen, 1991). Therefore, not only measuring visitors' intentions too long after a zoo visit infringes upon this condition, but denies the additive quality of human learning, which in turn influences intentions. Given this, I assessed conservation intentions using onsite evaluations during a single visit considering that research conducted in zoos and aquariums shows that measuring behavior change (not intention) following a visit is challenging (Ballantyne & Packer, 2011; Hughes, 2013). Consequently, conservation intentions was my main dependent variable, and I intended to identify what single variable, or combination of variables, could better predict visitors' conservation intentions (Figure 2.1).

Research Questions

Based on the literature review, more research is needed to identify the relationships between engagement, subjective and objective knowledge about birds, conservation caring, state-curiosity, and conservation intentions. Specifically, it appears that all of these variables are potentially influential, but they have not been evaluated in one model or in the context of a single zoo visit. Additionally, researchers have not investigated the mean differences of these constructs before and after a zoo visit. These research gaps, as well as the needs of Aviary managers for information about visitor outcomes, led to three research questions investigated in this study. For all research questions, please see Figure 2.1 for a visual display.

1. Are pre- and postmeans for curiosity, caring, and conservation intentions significantly different after a single visit?

   Hypothesis: The postvisit means for curiosity, caring, and conservation intentions will be higher than the previsit means; however, these may not be statistically significant.

2. Do visitors' level of engagement, past visitation history, and knowledge (subjective and objective) influence curiosity, caring, and conservation intentions?

   Hypothesis: The level of engagement will most strongly influence curiosity, caring, and conservation intentions compared to the other variables.

3. Regarding level of engagement, past visitation history, knowledge (subjective and objective), curiosity, caring, and conservation intentions, which are the best predictors for visitors' conservation intentions?

Hypothesis: I would expect the following combination of factors to be the best predictors of conservation intentions: Prior knowledge *x* level of engagement; Past Visitation Use *x* level of engagement; Level of engagement *x* caring.

Methods

Study Site

Tracy Aviary is the oldest and largest free-standing, public aviary in the United States. It was founded in 1938, when Sir Russell Lord Tracy, a banker from Salt Lake City, donated his private collection to the city. In its 8.5-acres, Tracy Aviary houses more than 135 different bird species, mostly from the Americas, and participates in population management programs towards species conservation. As an accredited facility, Tracy Aviary meets rigorous standards for bird care, visitor service, facility maintenance, and environmental efficiency. Similarly, it is committed to the conservation of wild birds and habitats, and devotes 6% of its operational budget to support field conservation. Tracy Aviary accomplishes its mission through the work of an interdisciplinary team that works in six different departments: administrative, aviculture, conservation science, development, education, and horticulture & facilities. Approximately 125,000 visitors per year come to Tracy Aviary, and the highest visitation rates occur during late spring and summer.

Guiding Framework

For a guiding framework to address the research questions, I selected an exploratory mixed methodology (Creswell & Plano Clark, 2011; Greene, Caracelli, &

Guiding Framework

For a guiding framework to address the research questions, I selected an exploratory mixed methodology (Creswell & Plano Clark, 2011; Greene, Caracelli, & Graham, 1989) with three connected phases (i.e., Exploratory Sequential Design; Creswell and others, 2003). In Phase 1, a focus group was conducted with Tracy Aviary staff. In Phase 2, a measurement instrument was developed, and finally in Phase 3, the instrument (i.e., paper questionnaire) was administered onsite to Tracy Aviary visitors. I selected this sequential process (the Instrument Development Variation; Creswell & Plano Clark, 2011) because 1) not all quantitative measures or instruments for the phenomenon under investigation were available, 2) some variables were unknown, and 3) due to the novelty of the investigation, numerous frameworks or theories were applicable (Morgan, 1998; Morse, 1991).

Phase 1 – Interviews

During Phase 1, a focus group (75 minutes; $n = 5$) was facilitated (Seidman, 2006) with Tracy Aviary staff responsible for program development and delivery of programs, and visitor engagement. The purpose of this focus group was to identify and rank the elements of the visitor experience that most contributed to visitor engagement with birds, exhibits, and staff. During this focus group, participants completed worksheets and participated in iterative discussion. As an outcome, the results from Phase 1 informed measurement approaches for an 'engagement index' that was part of a visitor questionnaire developed in Phase 2.

Phase 2 - Instrument Development

During Phase 2, I adapted previously validated scales for the main constructs in Figure 2.1 (following procedures outlined by DeVellis, 2003; Noar, 2003 for scale adaptation). Specifically, the questionnaire contained six sections that captured visitors' levels of a) *visitation history* using a 3-item experience use history unit-weight composite index that was adapted from previous studies (Schreyer, Lime, & Williams, 1984), b) level of *engagement* with exhibits, programs, and staff using a unit-weight composite index informed by Phase I focus group, [1] c) *conservation caring* (latent variable adapted from Skibins & Powell, 2013), d) *state-curiosity* (latent variable adapted from Naylor, 1981), e) *subjective knowledge* (latent variable informed by Brucks, 1985; Carlson, Vincent, Hardesty, & Bearden, 2009; Taheri, Kafari & O'Gorman, 2014), f) *objective knowledge* about birds (a unit-weight composite index created with Tracy Aviary's staff), g) *conservation intentions* (latent variable adapted from Wagner, Chessler, York, & Raynor, 2009), and h) *demographics* using standard U.S. Census Bureau categories for ethnicity, education, occupation, zip code, income, and age. Following the adaptation of items and scales, experts (n = 3) reviewed all items and the questionnaire for content validity and clarity, and suggested edits were incorporated.

Phase 3 – Administration of the Instrument

Using the final measures developed in Phase 2, a 6-page anonymous questionnaire was administered to Tracy Aviary visitors during an 8-week peak visitation period in June and July of 2015. I used a systematic random probability sampling method

[1] Engagement Index: Read exhibits + No. exhibits + Interact with staff + (No. hours staying *2)

to ensure representativeness (Vaske, 2008) with visitor intercepts occurring at the entrance and exit of the Aviary (Appendix E). Using an Independent-Samples design, one visitor per group (e.g., family, small traveling group of friends) completed only one of the pre- or postexperience questionnaires prior to or after their Aviary experience.

Analysis

First, I used standard calculations for leverage, kurtosis, and skewness to identify statistical outliers and to verify univariate and multivariate normality of the data (Tabachnick & Fidell, 2001). A small number of cases (n = 30; 4.8% of data) were excluded from subsequent analysis due to extreme violations of multivariate normality and missing data (> 50% of questionnaire). Next, with assistance from my committee, I evaluated the research questions using Structural Equation Modeling (SEM) approaches with EQS 6.1 software.

Since I was interested in knowing whether differences in numerous constructs appeared as a result of a visit, verifying consistent measurement performance across pre- and postsampling was critical. In short, I sought to ensure that any identified differences in responses between pre- and postmeasures were attributed to true score variance and not statistically confounded by differences in measurement performance. Byrne (2008) refers to this process as verifying *metric invariance*, which is critical when using multiple item constructs to compare differences in groups or measurement occasions.

Consequently, for all multiple item measurements, a process outlined by Byrne (2008) was followed, which starts with a baseline configural measurement model for both pre- and postsamples. Next, equality constraints were placed on factor loadings and error

covariances (Metric Invariance Model). As recommended, I evaluated the harm to fit between the configural model and metric invariance model using the change in absolute and relative fit indices and the Satorra-Bentler χ^2 Difference Test ($SB\chi^2$; Byrne, 2006; Satorra & Bentler, 2001). Byrne (2006) indicates metric invariance is assumed when no significant harm to the model fit occurs between models (i.e., nonsignificant change in the $SB\chi^2$). Through imposing these constraints and evaluating the outcome, the performance of each of the adapted scales was assessed. After testing for metric invariance, I introduced a constant into the model, which allowed for evaluation of the differences in the estimated means of conservation caring, state-curiosity, subjective and objective knowledge about birds, and conservation intentions between pre- and postvisit samples (a process similar to independent samples *t*-test).

Next, I evaluated the proposed model (Figure 2.1) using Structural Equation Modeling (SEM) involving a comprehensive measurement model and a subsequent Structural Regression Model (SRM) to evaluate relationships between constructs (Byrne, 2008). As recommended, I used numerous fit indices to evaluate the configural, metric, and structural regression models. First, I used the Satorra-Bentler Chi-Square ($SB\chi2$), a robust procedure that adjusts for multivariate non-normal characteristics within the data, which is interpreted similar to the standard Chi-Square (Satorra & Bentler, 2001). Although a nonsignificant $SB\chi2$ value is ideal (indicating no difference between the model and the data), it is only one evaluative element used to assess model fit and more complex models often produce statistically significant $SB\chi2$ values (Byrne, 2008; Kline, 2011). Therefore, as recommended, additional fit statistics were used to further examine the relationship between the data and each model: a) the Comparative Fit Index (CFI),

which measures the level of discrepancy between the hypothesized model and the null or baseline model, b) the Non-Normed Fit Index (NNFI), which functions similar to the CFI but further accounts for model complexity, c) the Standardized Root Mean Square Residual (SRMR), which is a measure of the difference between the observed data and reproduced data matrices, and d) the Root Mean Square Error of Approximation (RMSEA), which is measure of the lack of fit per degree of freedom (Byrne, 2008). Each of these measures has acceptable levels of good fit (CFI > .9; NNFI > .90; SRMR < .1; RMSEA < .08; Byrne, 2008; Kline, 2011) but these are "interpretive guidelines" only (Kline, 2011, p. 135). Therefore, these guidelines, including the SBχ2, are a conglomerate of information and should be interpreted holistically with theoretical and conceptual insight (Byrne, 2008; Kline, 2011).

Results

Description of the Sample

I approached 1,305 individuals or groups visiting Tracy Aviary and 607 completed the questionnaire, resulting in a 46% response rate and yielding a 3.96 confidence interval at 95% confidence level. The final sample (n = 579 visitors, pre = 282 and post = 297) consisted of mainly White (85.4%) females (66.1%) with moderate levels of education (31.1% had 4-year college degree). Approximately, 21% of the sample reported an annual income between $50,000 and $74,999. The average group size was 3.4 people (SE = 0.10) and the median for number of visits in the past 12 months to Tracy Aviary was 1.0. Nearly, 82% of the visitors were not members of Tracy Aviary and the median for time spent at Tracy Aviary was 2.0 hours. Statistical differences were

compared in demographics and visit characteristics across the two samples using Analysis of Variance (ANOVA) and Cross Tabulations (χ^2), which resulted in no identified differences ($p > 0.05$), indicating similar visitors were captured in the pre- and postsampling.

Visitors' Knowledge, Caring, Curiosity, and Conservation Intentions Before and After a Visit

Visitors expressed moderate levels of subjective knowledge in pre- and postsampling periods ($M = 4.98$ and 5.11 respectively; see Table 2.1). Conversely, visitors reported relatively high levels of conservation caring ($_{pre}M = 6.89$; $_{post}M = 7.21$; Table 2.1) and conservation intentions ($_{pre}M = 6.76$; $_{post}M = 6.83$; Table 2.1). The highest response means were reported for curiosity where high curiosity scores were observed ($_{pre}M = 7.52$; $_{post}M = 7.69$; Table 2.1). Addressing RQ1, reported means for subjective knowledge, objective knowledge, curiosity, and conservation intentions were not significantly different between pre- and postsamples ($p > 0.05$; see Figure 2.2 and Table 2.2). However, conservation caring means were significantly different between pre- and postsamples ($t = 2.61$; $p < 0.05$; see Figure 2.2), indicating that a single visit to the Aviary contributed to slight increases in visitors' conservation caring.

Measurement Invariance and Performance

Regarding the measures for conservation caring, state-curiosity, subjective knowledge about birds, and conservation intentions, all factor loadings exceeded 0.70 and all reliability estimates (Rho) exceeded 0.87, signifying that the items were reliable

Table 2.1.

Factor loadings, means, standard deviations, and reliability of subjective knowledge, curiosity, and caring about birds, and conservation intentions pre- and postvisit.

Construct	Items	Previsit λ	Mean[a] *(sd)*	Postvisit λ	Mean[a] *(sd)*
Subjective knowledge		-	4.98 (1.98)	-	5.11 (1.94)
	I know a lot about birds	0.8	5.91 (1.89)	0.79	5.97 (1.83)
	My knowledge about birds is high	0.82	5.69 (2.02)	0.85	5.77 (1.99)
	Others see me as an expert regarding birds	0.86	4.32 (2.31)	0.85	4.47 (2.35)
	Knowing a lot about birds is who I am	0.87	4.33 (2.31)	0.83	4.45 (2.25)
	I understand most things about birds	0.95	4.86 (2.23)	0.93	5.04 (2.19)
	My understanding about birds is great	0.98	4.81 (2.27)	0.96	5.07 (2.29)
	Reliability coefficient *RHO*	0.93	-	0.93	-
Caring about birds		-	6.89 (1.52)	-	7.21 (1.32)
	My emotional well-being will be diminished if some birds go extinct	0.77	6.99 (1.92)	0.76	7.30 (1.70)
	I will alter my lifestyle to protect birds	0.86	7.01 (1.68)	0.88	7.31 (1.49)
	My connection to birds increases my love of nature	0.84	7.37 (1.47)	0.83	7.78 (1.21)
	Bird protection must be society's highest priority	0.85	6.44 (1.99)	0.7	6.82 (1.88)
	I need to learn everything I can about birds	0.85	6.65 (1.67)	0.76	6.81 (1.59)
	Reliability coefficient *RHO*	0.92	-	0.88	-
Curiosity about birds		-	7.52 (1.26)	-	7.69 (1.34)
	I want to know more about birds	0.84	7.76 (1.20)	0.9	7.92 (1.28)
	I feel curious about what is happening with birds	0.87	7.72 (1.25)	0.96	7.90 (1.29)
	My curiosity about birds is high	0.95	7.41 (1.43)	0.98	7.57 (1.55)
	I am really interested in birds	0.96	7.34 (1.42)	0.91	7.54 (1.53)
	I feel like seeking information about birds	0.94	7.29 (1.47)	0.83	7.39 (1.60)
	Learning about birds is interesting to me	0.89	7.63 (1.37)	0.88	7.83 (1.33)
	Reliability coefficient *RHO*	0.96	-	0.96	-

Table 2.1. Continued

	Items	Previsit λ	Mean[a] *(SD)*	Postvisit λ	Mean[a] *(SD)*
Conservation intentions		-	6.76 (1.44)	-	6.83 (1.37)
	Talk to my family and friends about improving their own behaviors	0.86	6.73 (1.61)	0.75	6.69 (1.76)
	Contribute money to an organization seeking donations to preserve birds	0.83	6.28 (1.74)	0.8	6.49 (1.70)
	Purchase products for my home that do not harm birds	0.82	7.22 (1.58)	0.7	7.41 (1.45)
	Tell my family about volunteer and bird-related donation opportunities	0.89	6.50 (1.76)	0.9	6.49 (1.81)
	Make my yard or neighborhood 'bird friendly' by adding bird feeder	0.71	7.56 (1.59)	0.64	7.49 (1.67)
	Volunteer for projects that aim to create good bird habitat	0.79	6.57 (1.80)	0.77	6.45 (1.93)
	Reliability coefficient *RHO*	0.94	-	0.91	-

Notes. [a] Rated as agreement on a nine point Likert scale (transformed to 1 = completely disagree, 9 = completely agree). λ = standardized factor loading. *SD* = standard deviation. Reliability coefficient *RHO* is an adjusted Cronbach's Alpha that accounts for unequal contributions from items.

Table 2.2

Means, standard deviation, and questions included in the index for objective knowledge

Construct & Items	Previsit Mean [b] (*sd*)	Postvisit Mean [b] (*sd*)
Objective Knowledge [b]	4.99 (1.15)	5.18 (1.23)
What makes a bird a bird? [a]	-	-
Which bird is a bird? [a]	-	-
Birds' roles [a]	-	-
Cumulative score for True and False questions	-	-

Notes. [a] multiple selection questions; [b] a unit-weight composite index; *SD* = standard deviation

Table 2.3.

Metric invariance test results for visitors' curiosity, caring, and conservation intentions across measurement occasions.

Model	CFI[a]	NNFI[a]	SRMR	RMSEA[a]	SBχ^2 (*df*)[a]	Δ SBχ^2 (*Δ in df*)[a, c]
Subjective knowledge						
Previsit CFA	0.998	0.996	0.019	0.046	11.03*(7)	
Postvisit CFA	0.988	0.974	0.016	0.101	27.59*(7)	
Configural model	0.993	0.986	0.018	0.078	37.88*(14)	
Metric invariance model[b]	0.993	0.988	0.024	0.070	44.67*(19)	4.55 (5) n.s
Caring						
Previsit CFA	0.978	0.956	0.029	0.092	16.35*(5)	
Postvisit CFA	0.972	0.943	0.037	0.104	20.69*(5)	
Configural model	0.975	0.950	0.033	0.097	36.1*(10)	
Metric invariance model[b]	0.974	0.963	0.040	0.083	41.26*(14)	2.24 (4) n.s
Curiosity						
Previsit CFA	0.986	0.974	0.014	0.072	19.33* (8)	
Postvisit CFA	0.983	0.969	0.016	0.074	20.83* (8)	
Configural model	0.985	0.971	0.015	0.073	40.27* (16)	
Metric invariance model[b]	0.984	0.972	0.029	0.065	46.07* (21)	3.83 (5) n.s.
Conservation Intentions						
Pre visit CFA	0.986	0.974	0.026	0.059	15.57* (8)	
Postvisit CFA	0.972	0.947	0.042	0.084	24.48*(8)	
Configural model	0.979	0.960	0.035	0.073	40.05*(16)	
Metric invariance test model[b]	0.971	0.959	0.048	0.074	53.57*(21)	3.56 (4) n.s.

Notes. [a] Robust statistics; [b] constraints placed on factor loadings and error covariances; [c] difference calculated using the Satorra-Bentler Scaled Chi-Square adjusted difference test (Satorra & Bentler, 2001); CFA = confirmatory factor analysis; CFI = comparative fit index; *df* = degrees of freedom; NNFI = non-normed fit index; n.s. = not statistically significant at $p < 0.05$; RMSEA = root mean square error of approximation; SB χ^2 = Satorra-Bentler Scaled Chi-Square; SRMR = standardized root mean squared residual. * $p < 0.05$

indicators of their respective constructs (see Table 2.1; Kline, 2011). Overall, $\Delta SB\chi 2$ exhibited limited change and model fit indices remained stable between the hierarchical models of constraints (see Table 2.3). This suggests that measurement characteristics (factor loadings, factor structure, and error covariances) for the multi-item constructs in Figure 2.1 were generally equivalent across pre- and postsamples. Furthermore, all fit indices for subjective knowledge, curiosity, caring, and conservation intentions exhibited appropriate levels (CFI > .9; NNFI > .90; SRMR < .1; RMSEA < .08; Byrne, 2008; Kline, 2011). Therefore, the changes in these constructs due to an Aviary visit were investigated without concern of influence from measurement differences between pre- and postexperiences, or large deviations from true score variance.

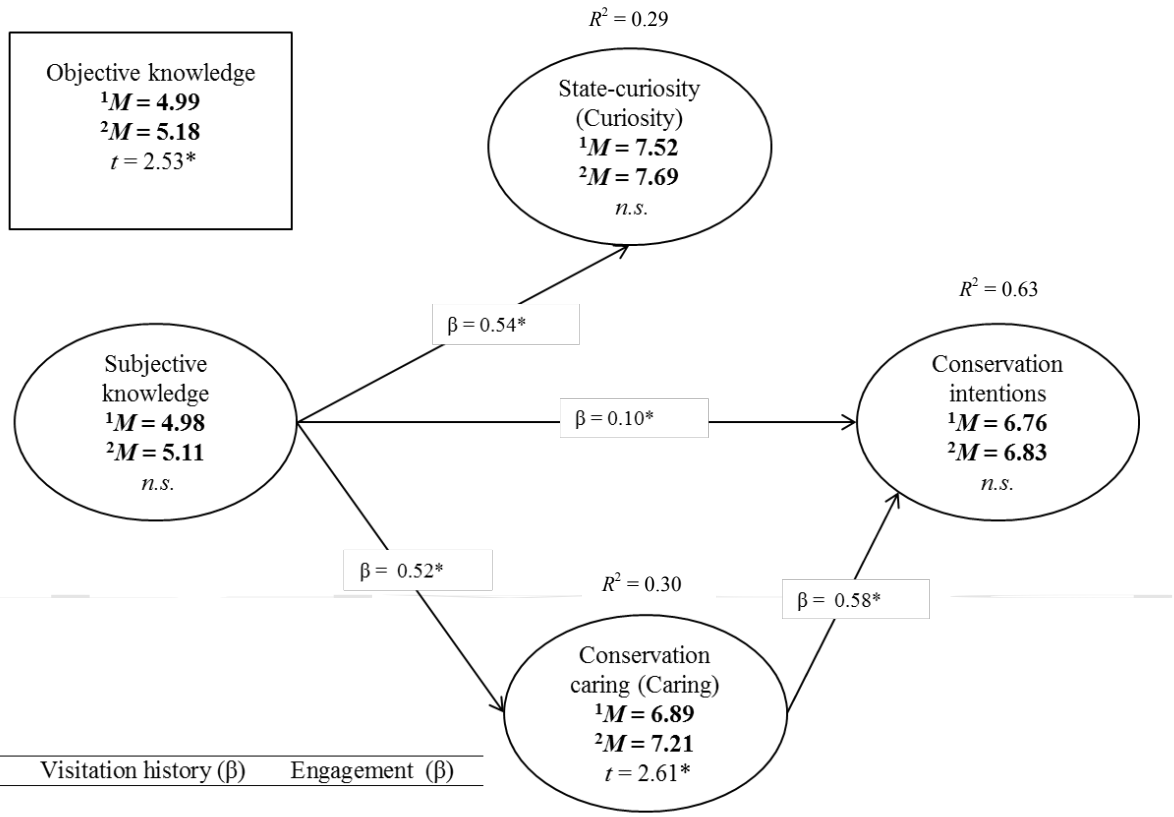
Similarly, objective knowledge scores were also significantly different between pre- and postsamples ($t = 2.53$; $p < 0.05$; see Table 2.2 and Figure 2.2), suggesting that the educational information offered at the Aviary may have contributed to slight increases in visitors' objective knowledge about birds. I partially supported my hypothesis that postmeans would be higher but not significant; objective knowledge and caring were, however, statistically significant.

Final Model and Relationships between Constructs

Figure 2.2 addresses RQ2 and RQ3 and displays the overall relationships between observed and latent variables using postvisitation data. This model exhibited appropriate fit, signifying congruency between the modelled relationships and the actual visitor data (CFI = 0.96; NNFI = 0.95; RMSEA = 0.06; SRMR = 0.06; $SB\chi^2 = 403.15$; $p < 0.05$).

As indicated in Figure 2.2, visitation history and level of engagement during an Aviary visit positively influenced objective and subjective knowledge, caring, curiosity, and conservation intentions (all $\beta \geq 0.09$ and ≤ 0.15). This is an important finding because it indicates that although a single visit to the Aviary may not produce significant changes in visitors' reported mean scores for subjective knowledge, caring, curiosity, and conservation intentions, multiple visits (i.e., visitation history) are likely to influence these constructs. Therefore, regarding visitors' conservation intentions, encouraging repeat visitation at a zoo or an Aviary is quite important. Furthermore, the level that a visitor engages with Aviary staff, species, and infrastructure (i.e., engagement) has the capacity to influence these constructs as well (Figure 2.2). This suggests that more engaged visitors at the Aviary are more likely to gain knowledge about birds, care, and be curious about birds, and ultimately, participate in conservation actions that benefit birds.

My hypothesis for RQ2 was partially supported because engagement influenced caring, curiosity, and conservation intentions. In addition to level of engagement, the visitation history had an impact on the other response variables. Regarding the study's dependent variable of conservation intentions, the results displayed in Figure 2.2 indicate that visitation history ($\beta = 0.11$), engagement ($\beta = 0.13$), subjective knowledge ($\beta = 0.10$), and conservation caring ($\beta = 0.58$), account for 63% of the variability in conservation intentions. However, objective knowledge and curiosity were not significant predictors of conservation intentions. Therefore, addressing RQ3, conservation caring appears quite influential on conservation intentions, and at least in this study is the strongest single predictor of conservation intentions, and as a single predictor accounts for 53% of the variance in conservation intentions.



	Visitation history (β)	Engagement (β)
Objective knowledge	0.13**	0.11**
Subjective knowledge	0.09*	0.12**
Caring	0.15***	0.09*
Curiosity	0.09*	0.15***
Conservation intentions	0.11*	0.13**

Figure 2.2. Full Structural Regression Model for the relationships between constructs; all items rated as agreement on a nine point Likert scale (transformed to 1 = completely disagree, 9 = completely agree); only statistically significant paths are displayed; the model included visitation history and engagement with standardized estimates displayed in table; β = standardized parameter estimate; *M* = estimated mean score; *t* = estimated *t*-value; CFI = 0.96; NNFI = 0.95; RMSEA = 0.06; SRMR = 0.06; SBχ^2 (df) = 403.15* (298); $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$, n.s. = not statistically significant.

Considering caring was the strongest single predictor of conservation intentions, the hypothesis for RQ3 was not supported.

Subjective knowledge appears to have a prominent role in Figure 2.2 with substantial influences on curiosity ($\beta = 0.54$), conservation caring ($\beta = 0.52$), and conservation intentions ($\beta = 0.10$). Conversely, increases in objective knowledge did not significantly correspond to increases in caring, curiosity, and conservation intentions. This finding suggests that regarding conservation intentions, it is important how much a visitor *thinks* they know about birds as opposed to how much they *objectively* know about birds. For example, a visitor that scores low on objective knowledge but high on subjective knowledge may report high levels of caring, curiosity, and ultimately conservation intentions.

Discussion

This research had three main objectives, to determine: 1) if visitors' knowledge (subjective and objective), caring, curiosity, and conservation intentions changed after a single visit to Tracy Aviary, 2) if visitors' level of engagement during a visit, visitation history, and knowledge (objective and subjective) influenced their caring, curiosity, and conservation intentions, and 3) the single best predictor of visitors' conservation intentions. The results suggest that 1) objective knowledge and caring scores increased significantly as a result of the visit, 2) that visitation history and engagement impacted knowledge, curiosity, caring, and conservation intentions, and 3) caring is the best single predictor of conservation intentions compared to knowledge, curiosity, visitation history, or engagement. These results and other associated findings provide numerous points for

discussion, several of which are offered below.

Objective Knowledge and Caring

Caring and objective knowledge significantly changed after a visit, but there were not significant changes in visitors' conservation intentions, subjective knowledge, or curiosity. Related to this finding, Powell and Ham (2008) also observed a 10% increase in national park visitors' objective knowledge after a single visit that included interpretation and educational programming. Similarly, Falk and Alderman (2003) assessed entering and exiting visitors' knowledge in the National Baltimore Aquarium and found larger effects when they analyzed the data by category of knowledge.

Zoos have long assumed that simply providing information will generate visitor conservation behavior change, which may, at times, oversimplify the complexity of visitor education.

Specifically, in this study, increases in objective knowledge did not influence visitors' conservation intentions. Ballantyne, Packer, Hughes, and Dierking (2007) acknowledge this 'knowledge-intention gap' and suggest that zoo experiences should facilitate the connection between visitors' existing knowledge and new information acquired during a zoo experience. In this sense, Ham and Weiler (2002) suggest that connecting visitors emotionally and intellectually is a fruitful avenue to accomplish changes in visitors' conservation intentions.

Related to Ham and Weiler's (2002) suggestion, in this study, caring was a good predictor variable of visitors' conservation intentions. Furthermore, and directly related to this current study, visitors' caring before and after a visit to Tracy Aviary changed

significantly and exhibited more change than objective knowledge. This finding implies that at least in the short term of a visit, caring may have more influence on visitors' conservation intentions than increases in objective knowledge.

The fact that caring increased after a single visit is further highlighted by the finding that caring significantly influenced visitors' conservation intentions, and more so than visitors' knowledge, curiosity, visitation history, or engagement. This finding appears consistent with Skibins and Powell (2013) who found visitors' conservation intentions were influenced by their level of caring. Similarly, Verbos, Brownlee, and Skibins (in review) intercepted visitors after their tour to Denali National Park and found that caring influenced visitors' conservation intentions towards grizzly bears inside the park. Consequently, if zoos desire to increase visitors' conservation intentions, then influencing their caring for birds, and possibly for specific species, appears critically important.

Level of Engagement and Its Relation to Other Variables

This study revealed that the level of a visitors' engagement during a visit positively influenced objective and subjective knowledge, curiosity, and caring (Figure 2.2). To my knowledge, aside from Taheri, Jafari, and O'Gorman (2014), there is not a standard scale to measure engagement, nor a standard definition of it, which also motivated me to create a formative index to assess engagement more objectively using items identified by other authors and Tracy Aviary's management. As a result, this current study showed that engagement and knowledge are related; however, rather than using knowledge as a predictor of engagement such as Taheri and others (2014) did, I

used knowledge, both subjective and objective, as independent variables to assess their effect on curiosity, caring, and visitors' conservation intentions.

One interesting finding from this research is that after we split knowledge into objective (what people know) and subjective (what people think they know), we found that level of engagement had similar influence on both types of knowledge (Figure 2.2), but that the two types of knowledge influence visitor outcomes differently. Specifically, subjective knowledge influenced conservation intentions but objective knowledge did not. The implication for zoos born from this finding is that interpretation and education programs that help visitors' realize and conceptualize their view of their own knowledge level (subjective knowledge) may be as important as programs that actually increase visitors' knowledge (objective knowledge).

Visitors' level of engagement during the visit indirectly influenced conservation intentions through caring; improving visitors' engagement may, at least in the short term, increase visitor's conservation intentions. Visitors who expressed more caring (M = 8.32, n = 130) were generally more engaged, attended the bird show, and interacted. With these preliminary results, I cannot infer, however, if more caring individuals tend to engage more with these activities or if these activities cause more caring.

Related, level of engagement as a predictor of curiosity has not been explored, but in this research, engagement positively influenced curiosity in a single visit. The fact that average scores, pre- and postvisit, for curiosity did not change, may reinforce the need to assess not only state but also trait curiosity. It is also worthwhile to continue exploring which activities and programs may generate higher curiosity among visitors. So far, visitors with higher curiosity (M = 8.59, n = 170) observed the landscape, interacted with

staff, did self-guided tours, and were supportive of fee increase. Whether these activities cause more curiosity, or more curious visitors tend to choose these activities, is for now unknown.

Additionally, in this study, what visitors think they know (subjective knowledge), was positively influenced by their engagement during a single visit, yet differences in visitors' subjective knowledge were not detected in pre- and postsamples. These results need to be taken with caution, because not very often are both subjective and objective knowledge are analyzed simultaneously. Results of studies correlating subjective and objective knowledge in consumer research have been inconsistent; while some report significant positive correlations, others report weak nonsignificant correlations. If further tested, and significant correlations between objective and subjective knowledge exist, testing either of the two should suffice (Carlson, Vincent, Hardesty, & Bearden, 2009).

Predictors of Conservation Intentions

Visitation history, engagement, subjective knowledge, and conservation caring accounted for 63% of the variability in conservation intentions. Objective knowledge and curiosity were not significant predictors of conservation intentions. Conservation caring, at least in this study, was the strongest single predictor of conservation intentions, accounting for 58% of the variance. This result is consistent with Skibins and Powell (2013), who found that caring was the only strong predictor of species oriented conservation intentions.

The Role of Curiosity in Predicting Conservation Intentions

Curiosity and caring are central to Tracy Aviary's mission. However, estimates in curiosity did not significantly change before and after a visit. Since this is one of the few times that the adapted state-trait curiosity scale (Naylor, 1981) has been used in informal learning settings (e.g., an aviary or zoo), results need to be interpreted cautiously. While the curiosity scale performed well (*Rho* = 0.96 pre- and postvisit), I only assessed state-curiosity (curiosity aroused by an external factor), and in doing so, may have disregarded the importance of the degree that individuals were already curious (trait-curiosity). The influence of curiosity (or lack thereof) on conservation intentions has been suggested from a theoretical standpoint (c.f. Naylor, 1981; Baumergarten, 2001), yet further exploration of the construct and practical applications in zoos are some of the next steps. It is important to mention that most education programs at Tracy Aviary are targeted to inspire kids' curiosity, but people above 18 years old were my target sample. Aside from opportunities to volunteer, Tracy Aviary currently offers only two programs for adults: the Flying Wild Workshops specifically for teachers, and Birding by Ear workshops open for people 14 years and older. Education at zoos in the 1970s, and even now, is focused on children in hopes to form the environmentally aware adults of the future. While this is critically important, broader audiences in age and diversity also need to be engaged. An invaluable role for zoos that could heighten their role in conservation is involving decision makers and showcasing the zoo as a resource to educate them in environmental matters (Conway, 2007).

What After Conservation Intentions?

One of the goals for zoos of the 21st century is to motivate visitors' behavior change towards the environment, but zoo practitioners are aware of the difficulty to achieve this. I envision a set of steps to help the transition towards the behavior change. First, make the concept of conservation more understandable for visitors. For example, when visitors see the word conservation in the exhibits, what do they perceive and how does that relate to the conservation goals set by the Aviary? Making explicit what conservation means to Tracy Aviary, what Tracy Aviary as an institution intends to conserve, and finally, how the animals, exhibits, and messaging are conducive to these conservation goals is necessary.

Second, help bridge the gap for visitors to engage in proconservation behaviors by identifying the barriers visitors perceive by asking them what role, if any, they see Tracy Aviary could play to help overcome these barriers to engaging in behaviors that help conserve birds and the environment. It is well known that there is a gap to be filled once visitors leave the facility; while visitors may learn about environmental problems during their visit, after they leave the facility, they do not know how to continue to be engaged and to make an impact on conservation.

Third, experiment with programs or opportunities that allow critical thinking about environmental issues. "Education programs are limited by an unresolved debate about the extent to which the zoo should confine itself to servicing recreational objectives and teaching visitors about biology and animals, or broaden their role promoting critical thinking about a wide range of environmental issues" (Mazur, 2001, p. 209). There is an opportunity for Tracy Aviary and other zoos to be providers of information, and

facilitators of environmental discussions about local environmental issues through lectures or environmental fairs, for example. The goal is to help people understand the problems at hand and also present options to them to be part of the solution. Identifying key local partners depending on the local environmental issue at hand, and connect projects led by these partners with visitors, may open possibilities to not only build community but to engage the community as a first step.

Implications of This Research for Tracy Aviary and Other Zoos

Zoos have traditionally placed emphasis on measuring visitors' knowledge to assess their impact in conservation. While knowledge may change, it is a complex variable to measure given that the visitors bring previous knowledge, both subjective and objective, and this interferes with the interpretation of knowledge gain after a single visit.

Studies comparing the impact of a single visit on visitors like Balmford, Leader-Williams, Mace, Manica, Walter, West, and Zimmerman (2007) found no changes in conservation knowledge, concern, or ability to do something useful after a visit to the zoo. They suggest that while informal education has effects on visitors, it may take repeated visits and more time for visitors to show that effect. In my case, repeated visits influenced all variables, which makes sense because visitors elaborate on and connect the information the more times they are exposed to it. Focusing on increasing memberships and more deals like winter Wednesdays and Music for the Birds to encourage repeated visitation would then be alternatives to encourage repeated visitation.

This research suggested that how much visitors think they know about birds and conservation (subjective knowledge) appears to determine the decisions they make, more

than what they know as facts. If this is the case, efforts should not necessarily be centred on knowledge, and even less, on objective knowledge. In addition, it is necessary to continue researching the differences or relations between objective and subjective knowledge, and find standard scales to measure subjective knowledge.

Lately, caring has been proposed as a mediator of conservation intentions, and appears a promising construct to help understand underlying causes that move visitors to engage in pro-environmental behaviors. Immersive exhibits and activities like the bird show that allow close encounters with animals can create emotion-based experiences, like caring. In this regard, Gwyne (2007) proposes a novel idea: "Long before we talk architecture or landscape, perhaps even collections, we need to begin with a fearless inventory of what feelings, experiences and messages we want out visitors to get. It is not just thinking about exhibits and landscapes before architecture, but about creating meaningful emotive experiences before exhibits" (p. 61). As zoos role in conservation becomes more prominent and trends point to study emotions as drivers for people to care, exploring paths away from the traditional concept of zoo, new ways to deliver information and motivate emotions that influence people's conservation intentions appear important.

Related to this, the likelihood that a visitor expressed a conservation intention was mediated by caring, which reinforces the need to deepen our understanding of caring. How or what activities were related to visitors caring after their visit to Tracy Aviary? Visitors with higher scores of caring ($M = 8.32$, $n = 133$), for example, interacted with staff, attended bird shows, [2] and did self-guided tours. Tracy Aviary could experiment providing more opportunities for visitors to interact with staff, in hopes that this would

[2] Bird show: scripted 20-30 minute program with approximately 10 free-flight species.

increase their care for birds and, in turn, engage them in behaviors that attempt to conserve birds. More and more, zoos recognize that visitors want information about what they see, especially if it is explained by animal keepers and guides (Mazur, 2001). Opportunities for visitors to interact with staff directly related with animals at Tracy Aviary include keeper talks, bird encounters, and interactive feeding.

Finally, as the educational outcomes of zoos are evaluated, conservation efforts also need to be assessed if zoos want to be recognized as conservation organizations. Aside from funding provided for conservation and local research conducted, Tracy Aviary's role in regards to its contribution to in situ and ex situ conservation needs to be looked at. There is a young Conservation Science program with great potential at Tracy Aviary. Questions that need to be asked include the following: What percent of the space is used for breeding? What are the number of local species participating in Species Survival Programs? How is Tracy Aviary participating with other environmental stakeholders to conserve local species and habitats to help maintain common species common? Acting locally and thinking globally is one way to connect visitors with their reality, which they could later extrapolate to realities in other parts of the globe.

Future Studies

Taheri and others (2014) identified three elements that are relevant to engagement; *attractors* or things that call visitors' attention, *sustainers* or those things that keep visitors engaged during a visit, and *relators* or the things that make the visitor want to return. Tracy Aviary offers a diversity of experiences on-grounds. Through this study, we identified the activities visitors performed during a visit, but we were not able

to tease which of these activities or experiences visitors preferred or made them want to return. Hence, understanding which activities are most appealing for visitors can help managers at Tracy Aviary improve visitors' experience and further understand how the activities they engage in influence their conservation intentions. With a standardized measure for engagement, it may become less subjective. Using semistructured interviews or giving forms with prompts where visitors could report their experiences with different activities can help discern visitors' rationale about activities they perceive as most engaging.

Based on the results, I obtained, I would suggest Tracy Aviary focus on the following:

- Increase opportunities for visitors to interact with staff. For example, diversify and offer more keeper talks while assessing the impact of keeper talks on visitors. Gwyne (2007) found that 53% of zoo visitors mentioned that one of the ways they liked to learn was interacting with a person who answered their questions. Keeper talks, other animal encounters, or even informal talks at guest services could be powerful opportunities for Tracy Aviary to create an open dialogue between visitors and their staff. This dialogue space could be used more intentionally to raise visitors' awareness about local and current conservation issues depending on the context. Comparing visitors that attend and do not attend keeper talks, and their likelihood to engage in conservation behaviors would be an interesting follow-up study.
- Make opportunities for visitors to volunteer, specifically in conservation projects, accessible and offer entry-level opportunities. For example, one of the

conservation intentions visitors, scored highest was improving their backyards for birds. What if interested visitors, and hopefully neighbors of Tracy Aviary, would offer their yard as an experimental plot where other visitors could help make bird-friendly yards? What if these efforts to improve yards, one house at a time, are integrated into the city's forestry plan with the goal to increase connectivity among the urban forest patches? What if this in turn gives insight on the way green spaces can be managed more efficiently for people and wildlife?

- Consider using list-serves or other ways visitors could be informed and invited to participate in discussions of local conservation issues. Making Tracy Aviary the center for community gatherings to discuss these topics could heighten the role Tracy Aviary has in the local conservation community. Zoos are known for helping to inspire and connect people with nature. The next big step for zoos is to embrace conservation more holistically. For this endeavor, partnerships with other conservation organizations and stakeholders complement conservation efforts both *in-situ* and *ex-situ* (Dickie, Bonner, & West, 2007).
- Tracy Aviary offers different deals such as the "pass of all passes" on Tuesdays. The people that get this deal may differ from other visitor groups like members, who appear to voluntarily invest more money in Tracy Aviary. The members may be more interested in birds and the benefits that Tracy Aviary offers compared to the group that gets the "pass of all passes," which grants access to other recreational facilities. Comparing caring and curiosity between these visitors, and in general between members and nonmembers, can help inform the Aviary, which activities each of these group engages in and how these activities may relate to

curiosity and caring. Departing from the premise that the level of knowledge (objective and subjective) may also vary between these groups, it would be interesting to see what type of activities each group finds as the most engaging.

- 98% of the visitors read exhibits at the Aviary and the trends in some other zoos show a lower percent (Clayton, Fraser, & Saunders, 2009); thus, these results need to be analysed with caution, and lead to the future studies to: 1) identify if exhibits are fully or partially read; 2) identify the signs that visitors read the most, and 3) the qualities of the signs that make them appealing.

Conclusion

In conclusion, this research furthered the understanding of different variables used to predict conservation intentions. There were pre- and postvisit differences only in visitors' caring and objective knowledge. Findings also suggest that caring was the single best predictor of conservation intentions, which confirms the importance of evoking emotional responses. As the role of zoos as conservation organizations increases, and their contributions towards conservation are more pronounced, understanding the impact of the zoos on visitors' conservation outcomes and intentions becomes even more important. Deepening the understanding of caring seems a promising avenue to motivate visitors to conserve birds and other wildlife. The role of curiosity as part of Tracy Aviary's mission is worth exploring; revising the scale and considering other types of curiosity may help advance Tracy Aviary's mission.

CHAPTER 3

VISITORS' STUDY AT TRACY AVIARY

Executive Summary

Project Purpose

Zoos around the world receive millions of visitors annually, and aside from being spaces for people to entertain, their main roles are conservation and education. The purpose of this study was two-fold: first, to create a baseline for visitors' demographics, past use history, and the activities they engaged in while at Tracy Aviary because a study of this kind had not been conducted at this facility; and second, to assess Tracy Aviary's mission, using caring and curiosity, which are central in its mission, and determine, along with other variables, which best predicted visitors' conservation intentions.

Through this study, I was able to partially understand the impact of a single visit to Tracy Aviary and the extent to which the exhibits and activities offered at Tracy Aviary engaged visitors. Importantly, this research identified conservation intentions that visitors may likely perform related to their visit.

Research Approach

The data for this study were collected using paper questionnaires intercepting visitors before and after they visited Tracy Aviary. The questionnaire consisted of six sections: 1) past visits, 2) activities and reasons to visit, 3) feelings about birds, 4) potential behaviors, 5) knowledge about birds, 6) demographics and a final open-ended question about visitors' agreement or disagreement with a fee increase. Among the conservation intentions, visitors were presented with opportunities to talk to their friends / families about donating and /or volunteering for bird conservation projects, purchasing products that do not harm birds, keeping cats indoors to reduce bird mortality, or improving their yards for birds by adding feeders and water stations.

Questionnaires were administered between June and July 2015. A total of 1,305 visitors were intercepted and 607 of them completed a questionnaire (46% response rate). The results represent visitors to Tracy Aviary, and most results could be generalized to other zoo facilities. Visitors that completed the questionnaire were offered a 10% discount for purchases at Tracy Aviary's gift shop. Only one discount coupon per person was allowed.

After visitors completed the questionnaires, the data were entered into an excel database, then transferred to SPSS 23.0 where it was cleaned and screened for possibly spurious data. All questionnaires missing > 50% of the information were excluded from the study and after screening, data were analyzed using descriptive statistics, including maximum and minimum values, means, modes, medians, and standard deviations. Five hundred and seventy-nine questionnaires were usable for analysis. For information about demographics, past use history, and fee increase, I included pre- and postvisit data. I only

used postvisit data to assess the activities performed, motivations to visit Tracy Aviary, and visitors' willingness to engage in conservation intentions.

Project Conclusions

Sixty-six percent of the visitors had been to Tracy Aviary once in the past 12 months and, on average, visited in groups of 3.7 people. Sixty-six percent of the visitors were women and there was little racial diversity with 85% of the visitors self-reporting as White, and only 8% self-reporting as Latinos. Twenty-one percent of the visitors reported an annual income between $50,000 and $74,999 and 31% had a college degree.

The average time spent at Tracy Aviary was 2.0 hours and 28% of the visitors were members of Tracy Aviary. Eleven percent of the visitors claimed the discount coupon. Visitors participated in several of on-site activities and visited on average 10 exhibits of the 14 included in the questionnaire. Remarkably, 98% of the visitors self-reported they read the exhibit signs. Seventy-five percent interacted with staff, and 43% attended a bird show and voted in the conservation station. Spending time with family and friends was the main reason to visit Tracy Aviary followed by enjoyment of nature. Learning had the lowest average among the reasons to visit.

Most visitors knew basic information about birds and some of the roles birds play in ecosystems (e.g., pollinators, insect controllers, seed dispersers). The conservation intentions with the highest averages were related to purchasing bird friendly products and improving their yard for birds. Volunteering for projects to conserve birds or habitat and donating for birds had the lowest averages along with keeping cat indoors[3].

[3] This item was excluded from analysis in Chapter 2 of this thesis because of the variability in cat ownership. This variability likely influenced the statistics reported in this chapter as well.

Forty-nine percent of the visitors agreed with a fee increase for Tracy Aviary to continue investing in bird conservation, and 13% were not in favor of this increase. The others did not reply. Some advocated for keeping prices low or maintaining low fees for kids (Appendix C). More than 90% of the comments praised the facility, the staff, its exhibits, and landscapes (Appendix D).

General Findings

Description of the Sample

- I approached 1,305 individuals or groups visiting Tracy Aviary and 607 completed the questionnaire resulting in a 46% response.
- The final sample after data screening and cleaning was 579 visitors (pre = 282 and post = 297).

Demographics

- 85% visitors were Caucasian, and of these, 66.1% were females with moderate levels of education (31.1% had 4-year college degree).
- Approximately 21% of the sample reported an annual income between $50,000 and $74,999.

Past Use History

- The average group size was 3.4 people (*SE* = 0.10).
- The median for number of visits in the past 12 months to Tracy Aviary was 1.0.
- Approximately, 28% of the visitors were Tracy Aviary's members.
- The median for time spent at Tracy Aviary was 2.0 hours.

Reasons to Visit & Visitors Activities at Tracy Aviary

- Spending time with family or friends had highest means for motivations to visit followed by enjoyment of nature; learning had the lowest mean.
- The five exhibits visitors chose as favorites were owl forest, Andean condor, Chilean flamingos, eagles, and South American pavilion.
- 98% of visitors reported reading exhibit signs.
- 75% of the visitors interacted with staff.
- 20% of visitors attended a keeper talk.
- 43% of visitors voted at the conservation station.
- 43% of visitors attended the bird show.
- The most popular interactive feeding was duck feeding, and 25% of the visitors fed birds.

Visitors Knowledge About Birds

- Visitors appear to know about bird characteristics. About 38% of visitors knew birds had warm blood (n = 275); 89% (n = 275) of the visitors knew birds have feathers; 61% (n = 275) knew birds have a bill; and 71% (n = 275) knew birds lay eggs.
- In regard to the roles birds play, 90.2% (n = 246) of the visitors knew birds control insects, 84.1 % (n = 246) of the visitors knew birds are seed dispersers, and 54.9 % of the visitors knew birds are pollinators.
- 98% (n = 297) of the visitors correctly answered that male and female birds differ in appearance.
- About 45.1% (n = 297) of visitors knew birds have scales in their feet.

Conservation Intentions

- The conservation intentions with the highest agreement among visitors were "I will make my yard or neighborhood 'bird friendly' by adding or up keeping bird feeders and water stations" and "I will purchase products for my home that do not harm birds." Volunteering and donating for conservation (either themselves or ask their families) were ranked lower.

Introduction and Rationale

Zoos: Venues for Conservation and Recreation

Reducing pressures on biodiversity is one of the goals of the Convention for Biological Diversity, and zoos along with other conservation organizations are called to help address threats to habitats and species through the integration of *in-situ* and *ex-situ* conservation (Conde, Flesness, Colchero, Jones, & Scheuerlein, 2011). Aside from this important task, zoos are also places to entertain and socialize. Finding the delicate balance to achieve both is an enormous responsibility for zoos. Given the millions of visitors they receive, 700 million around the world and 181 million in the United States (World Association of Zoos and Aquariums, 2014; Zoo and Aquarium Statistics, 2014), zoos are uniquely positioned to expose visitors to conservation issues and actions. Measuring visitors' learning has become a goal for zoos; however, lately zoo managers have identified other variables that help predict visitors' engagement in pro-

environmental behaviors such as ‘conservation caring.’

Representation

This study is the first large study to understand visitation at Tracy Aviary. The results are generally representative of visitors to the Aviary.

Implications

This study can help inform Tracy Aviary about visitors’ demographics, past use history, the activities they engage in, as well as conservation intentions that could help foster long-term pro-environmental behaviors.

Methods

Instrument Development

I adapted previously validated scales for the main constructs in Figure 2.1 (following procedures outlined by DeVellis, 2003; Noar, 2003 for scale adaptation). The questionnaire contained six sections that captured visitors’ levels of a) *visitation history* using a 3-item experience use history unit-weight composite index that was adapted from previous studies (Brownlee et al., 2015; Schreyer, Lime, & Williams, 1984), b) level of *engagement* with exhibits, programs, and staff using a unit-weight composite index (Table xx) informed by Phase I focus groups, c) *conservation caring* (latent variable adapted from Skibins & Powell, 2013), d) *state-curiosity* (latent variable adapted from Naylor, 1981), e) *subjective knowledge* (latent variable informed by Brucks, 1985; Carlson, Vincent, Hardesty, & Bearden, 2009; Taheri, Kafari & O’Gorman, 2014), f)

objective knowledge about birds (a unit-weight composite index created with Tracy Aviary's staff), g) *conservation intentions* (latent variable adapted from Wagner, Chessler, York, & Raynor, 2009), and h) *demographics* using standard U.S. Census Bureau categories for ethnicity, education, occupation, zip code, income, and age. Following the adaptation of items and scales, experts (n = 3) reviewed all items and the questionnaire for content validity and clarity, and suggested edits were incorporated.

Administration of the Instrument

A six-page anonymous questionnaire was administered to Tracy Aviary visitors during an 8-week peak visitation period in June and July of 2015. I used a systematic random probability sampling method to ensure representativeness (Vaske, 2008) with visitor intercepts occurring at the entrance and exit of the Aviary. Using an Independent-Samples design, one visitor per group (e.g., family, small traveling group of friends) completed only one of the pre- or postexperience questionnaires prior to or after their Aviary experience.

Analysis

After data collection, data were entered into an excel database and later transferred to SPSS 23.0 Statistical Software Package for statistical analysis and reporting. The data set was cleaned for outliers and incomplete data using standard procedures (Tabachnick & Fidell, 2007). Descriptive statistics, including maximum and minimum values, means, modes, medians, and standard deviations, were explored to find patterns and trends among the sample.

Objective Knowledge Index

To create the objective knowledge index, only four of the questions asked in section 5 of the Appendix A were included. The question about threats was discarded, considering the difficulty to code among the many answers given, and that to some extent, except in in few cases, there would not be a right or wrong answer. I divided the total score for each question into the total number of possible correct points for that question. For example, for the question "What makes a bird a bird," there were five possible correct answers; each of the five selected options received 2 points. If a person checked all the five options (feathers, bill, eggs, flight, and warm blood) received 10 points. I divided 10 points by the total maximum of points which is 10. If fully correctly answered, it received one point. For the question "Which bird is a bird", the treatment was different since I included bat as an option. If a person chose bat as an option, I "penalized" them assigning a value of -4 points. The total number of correct points for this question was 8 points. I divided the number of points a visitor won by the total maximum of 8 points. If fully correctly answered after dividing, it received 1 point. For the question "Birds are known as," if a person checked all the three options (pollinators, seed dispersers, and insect controllers) it received 6 points. I divided 6 points by the total maximum of points which was 6. If fully correctly answered after dividing, it received 1 point.

Cumulative Value for True / False Questions

The answers visitors gave were coded as 1 = False, 2 = True, 0 = I don't know. I used the "if, then" function in excel to assign 1 point to the correct answer and 0 to an

incorrect answer.

- All birds fly – Correct answer is false
- Birds have scales in their feet – Correct answer is true
- Males and females of some species differ – Correct answer is true
- Birds have hollow bones – Correct answer is true

If correctly answered, the maximum score for the "cumulative T/F question" was 4. The objective index is then the sum of answers of the following 4 elements: What makes a bird a bird (1) + which bird is a bird (1) + birds roles (1) + true/false questions (4) = 7. The maximum score a person could obtain for the objective knowledge index equaled seven (7).

Results

Past Use History and Membership

Approximately 50% of the visitors to Tracy Aviary have visited it once in the past 12 months, spending on average 2 hours at Tracy Aviary (Table 3.1). Eighteen percent of the visitors surveyed before and after their visit to Tracy Aviary were members. Visitors have been members of Tracy Aviary for a minimum of 1 year and a maximum of 8 years (Figure 3.1).

Group Size and Time Spent at Tracy Aviary

Groups are, on average, of 3.4 persons and there are, on average, 2.2 children in the group (Table 3.2.)

Table. 3.1. Self-reported past use history for Tracy Aviary

	Mean (*sd*)	**Mode**	**Median**	**Max.**
Including this visit, approximately how times in the last year (12 months) have you visited Tracy Aviary?	3.7 (0.5)	1.0	1.0	104.0
Including this year, how many years (total) have you visited Tracy Aviary?	4.9 (0.5)	1.0	2.0	55.0
How many hours did you spend at Tracy Aviary today?	2.0 (0.0)	2.0	2.0	5.0

Table 3.2. Self-reported group size and number of children per group.

	Mean (*sd*)	**Mode**	**Median**	**Max.**
How many people are in your group?	3.4 (2.21)	2.0	3.0	20.0
How many children?	2.2 (1.53)	1.0	2.0	10.0

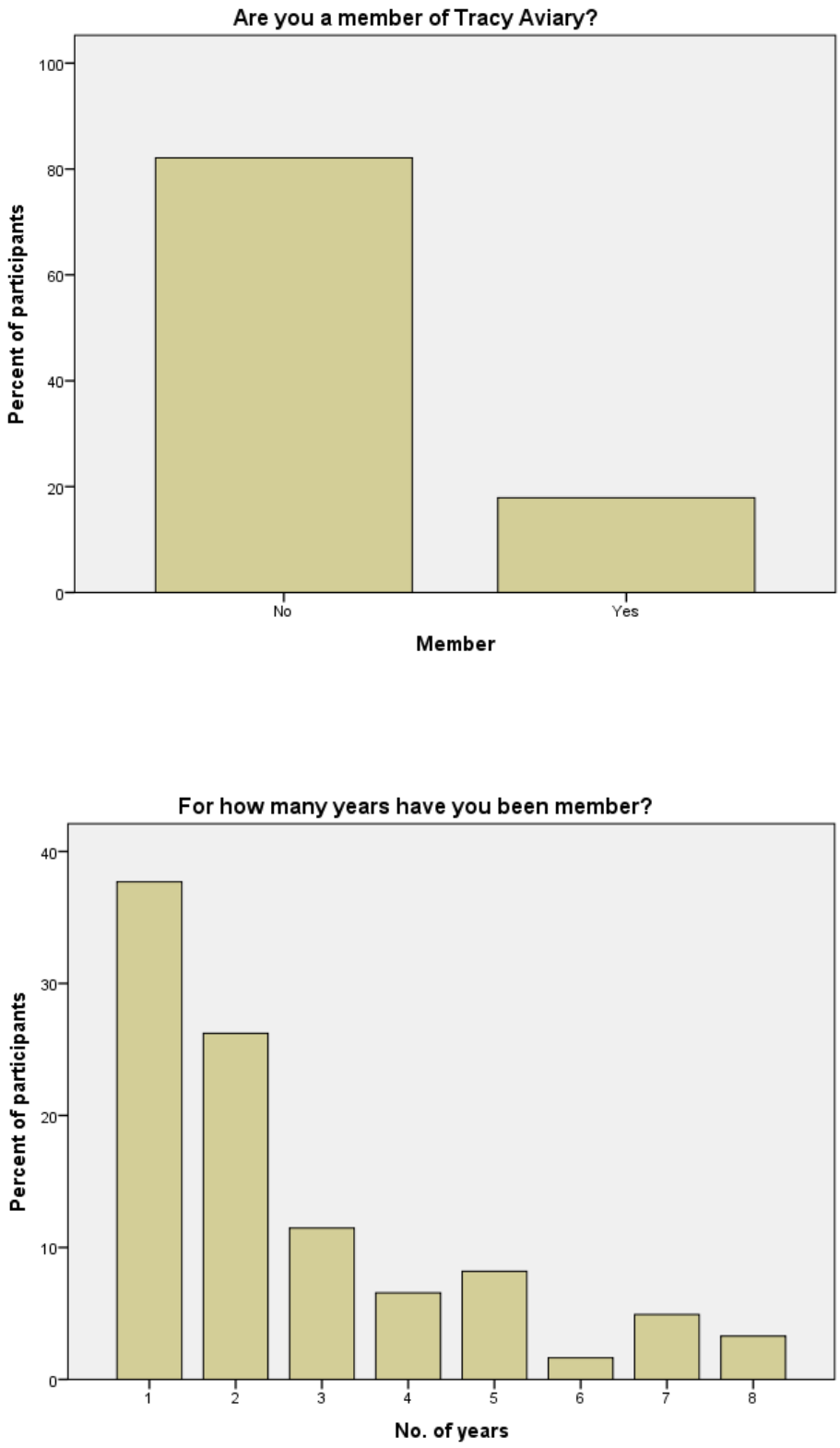


Figure 3.1. Membership (top) and number of years (bottom) visitors have been members.

Age and Gender

On average, visitors were 40 years old and the oldest visitor reported being 82 years old (Table 3.3). I did not interview anyone younger than 18 years old. Approximately 66% of the visitors sampled were women (Figure 3.2).

Education, Race, and Income

Fifty percent or more of the visitors had 4-year college and/or graduate degrees (Figure 3.3). Eighty-five percent of visitors were Caucasian and 8% were Hispanic / Latino(a). Pooling results and using the median and mode as the reference, the data suggest that most visitors to Tracy Aviary have income between $50,000 and $74,999; only 7% reported a household income higher than $150,000, and 18% make less than $35,000 in a year (Figure 3.4).

Most Common Activities Performed

Reading signs (98%) and observing the landscape (95%) were the most common activities during a visit. Seventy-five percent of visitors interacted with staff and 43% attended the bird show. Approximately 25% participated in a feeding program and 20% of the visitors engaged in a keeper talk (Table 3.4).

While approximately 75% of the visitors interacted with staff, only 20% reported attending keeper talk (Table 3.4). The staff interaction may have involved contact with guest services when they arrived at Tracy Aviary. Forty-three percent of the visitors voted in the conservation station. Increasing the presence of staff or volunteers in the conservation station, and the way this message is conveyed to visitors, can help visitors

Table 3.3. Age of visitors to Tracy Aviary.

	Mean (*sd*)	**Mode**	**Median**	**Max.**
Age	40.47 (13.91)	33.00	37.00	82.00

Table 3.4. Percent of the visitors and the activities done during their visit to Tracy Aviary.

Activity	**Percent of visitors (n)**
Did you read the exhibit signs?	98 (296)
Did you observe the landscape?	96 (293)
Did you interact with staff?	75 (292)
Did you vote at the conservation station?	43 (292)
Did you attend a bird show?	43 (294)
Did you participate in a feeding program?	25 (288)
Did you attend a keeper talk?	20 (286)

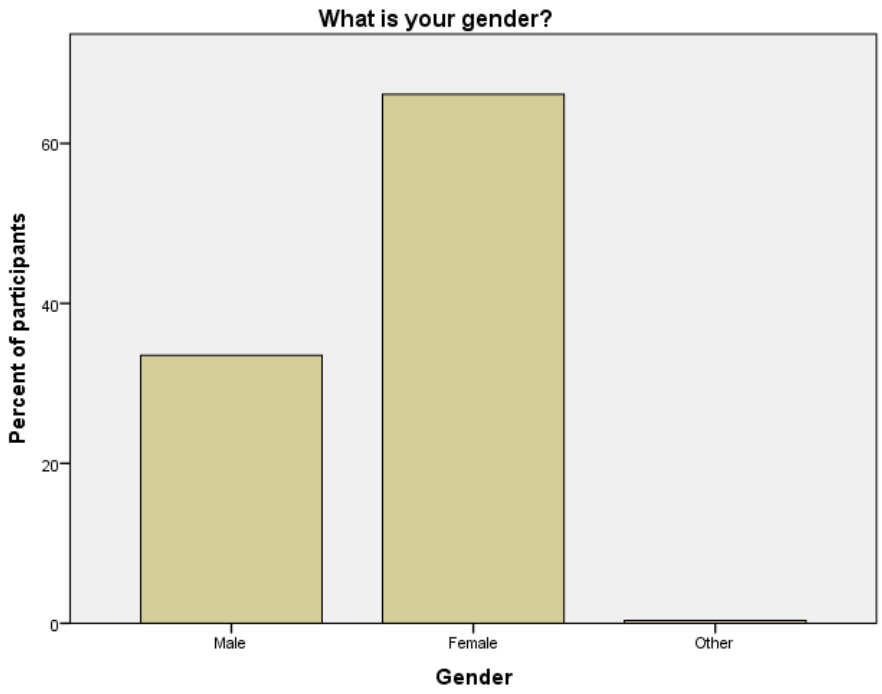


Figure 3.2. Gender of visitors to Tracy Aviary.

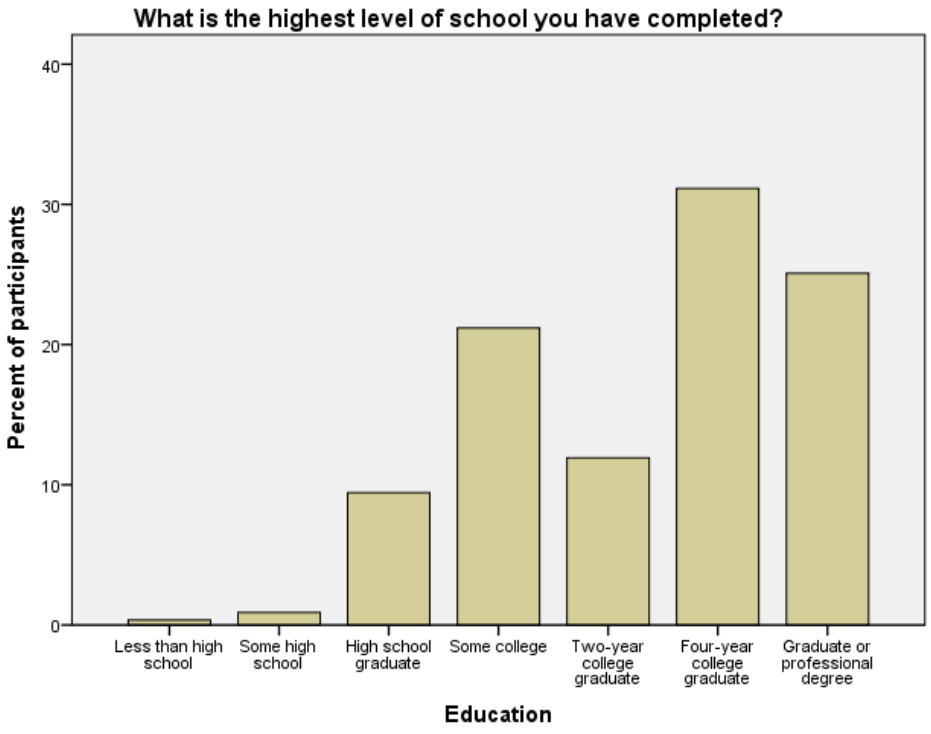


Figure 3.3. Highest level of schooling completed by visitors to Tracy Aviary.

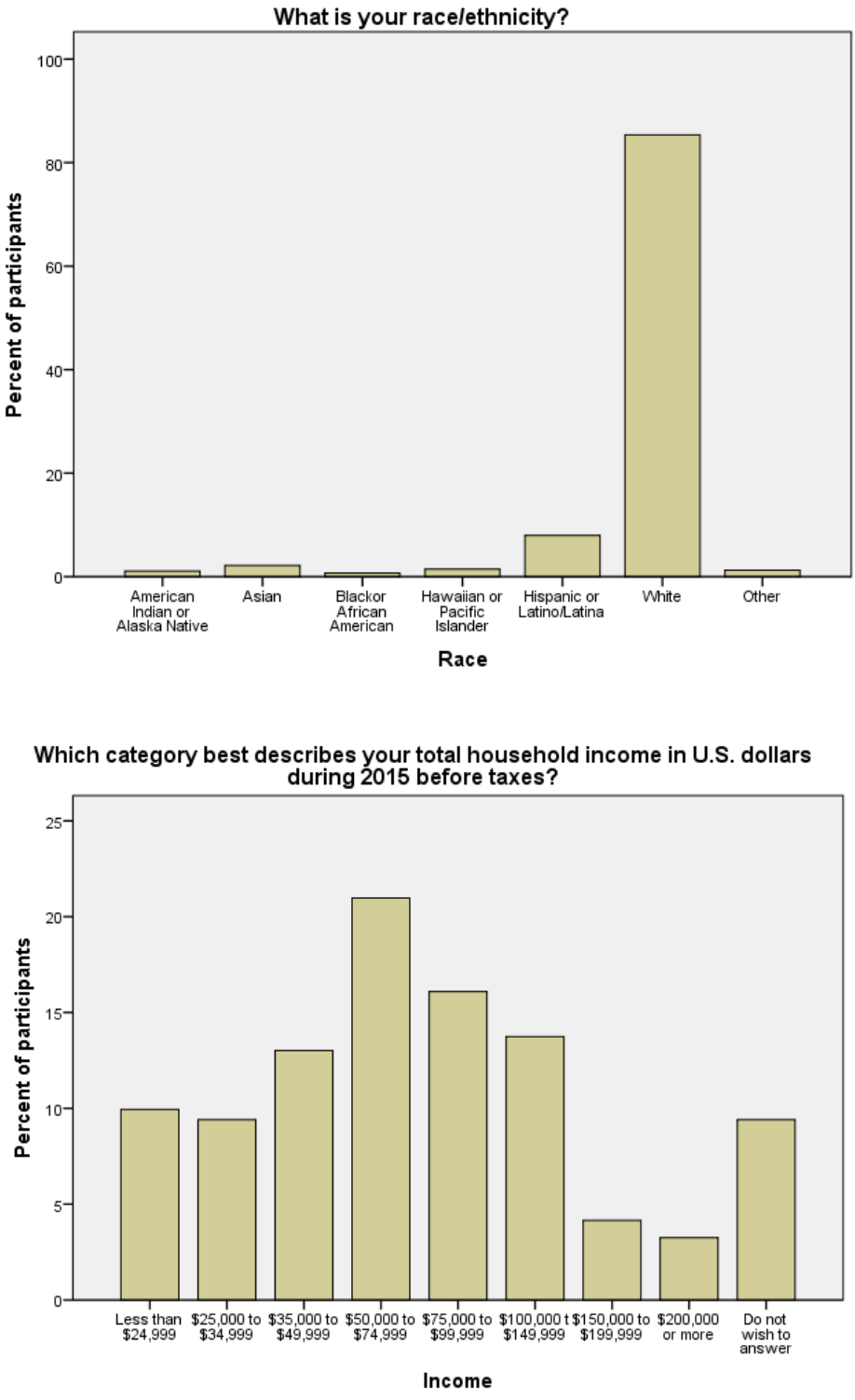


Figure 3.4. Race/ethnicity (top) and household income 2015 before taxes (bottom).

understand the role of the conservation station. Messaged adequately, this vote could be used as a way to empower visitors and make them active participants of the conservation decisions made at and by Tracy Aviary. Also, visitors could be invited to follow the progress on these projects at the station or online using videos, which could potentially motivate visitors to donate more toward these or other bird conservation projects.

Exhibits

On average, visitors went to 10 (± 3.77) exhibits out of the 14 included in the questionnaire. The five most favorite exhibits were owl forest (30% of the respondents, *n* = 88) and Andean Condor (15% of the respondents, *n* = 45); flamingos (8% of the respondents, *n* = 24), eagles (7% of the respondents, *n* = 21), and South American Pavilion (5% of the respondents *n* = 19).

Reasons to Visit

Based on the averages presented in Table 3.5, togetherness ranked highest, which suggests that the social aspect is likely one of the most important drivers for visitors. Learning ranked lower among the three constructs.

What Visitors Know About Birds

Using the postvisit sample only, visitors know most of the characteristics that make birds, except warm blood. However, these results need to be interpreted with caution. About 38% of the visitors knew birds had warm blood (*n* = 275); 89% (*n* = 275) of the visitors knew birds have feathers; 61% (*n* = 275) knew birds have bill; and

Table 3.5. Reasons to visit Tracy Aviary.

Reason to visit	*N*	Minimum	Maximum	Mean (*ds*)
Togetherness	296	--	--	8.22 (1.27)
Do something with your family and/or friends	296	1.00	9.00	8.32 (1.29)
Bring your family and/or friends close together	294	1.00	9.00	8.00 (1.53)
Be with people you enjoy	290	1.00	9.00	8.34 (1.29)
Learn	295	--	--	7.76 (1.20)
Learn more about birds	295	2.00	9.00	8.04 (1.16)
Study birds	290	1.00	9.00	8.00 (1.53)
Gain a better understanding of birds	294	1.00	9.00	8.00 (1.25)
Nature	295	--	--	8.05 (1.19)
Be close to nature	294	1.00	9.00	8.10 (1.26)
Enjoy the sounds and smells of nature	291	1.00	9.00	7.95 (1.37)
Experience a natural setting	295	2.00	9.00	8.11 (1.24)

71% (n = 275) knew birds lay eggs.

There was, however, ambiguity in questions such as flight and eggs, since not only birds fly or lay eggs. For other general characteristics of birds, 97.6 % (n = 297) of the visitors correctly answered that male and female birds differ in their appearance, 77% (n = 297) knew that birds have hollow bones, and about 45.1% (n = 297) of the visitors that came to Tracy Aviary knew birds have scales in their feet. In regard to the roles birds play, 90.2% (n = 246) of the visitors know birds control insects, 84.1 % (n = 246) of the visitors know birds as seed dispersers, and 54.9 % (n = 246) of the visitors knew birds are pollinators.

Conservation Intentions

Visitors are willing to purchase products that do not harm birds and making their yards bird friendly; these conservation intentions had the higher means. Donating and volunteering for conservation had lower means, similar to keeping cats indoors, but in

general, the trend was towards agreement to do these conservation intentions rather than not (Table 3.6, Figures 3.5 and 3.6).

Fee Increase to Continue Supporting Bird Conservation Projects

Including pre- and postvisit samples, 75% of the visitors (n = 416) were in favor of an increase in the entrance fee to support conservation projects (Figure 3.7). Several visitors provided comments about the fee increase (Appendix C). The reasons that supporters offered were related the cost and good quality of the overall experience (e.g., grounds, exhibits, activities offered), and some mentioned that the Aviary is underpriced. Importantly, several expressed a desire to support conservation. Some visitors suggested increasing the price for adults, but keeping kids at lower rates. Based on visitors' comments, it was evident that they wanted to know more about the conservation projects they would support and where exactly the money goes. While there is a conservation station and visitors had the option to cast their vote to three different projects, none of the visitors referred to it and only 43% of the visitors voted in the conservation station (Table 3.4). This suggests three things: 1) conservation efforts led by Tracy Aviary need to be

Table 3.6. Means, minimum, and maximum values for conservation intentions.

Intention	*N*	Minimum	Maximum	Mean *(ds)*
I will make my yard or neighborhood 'bird friendly	291	1	9	7.50 (1.66)
I will purchase products for my home that do not harm birds	296	1	9	7.41 (1.45)
I will talk to my family and friends to improve behaviors	296	1	9	6.69 (1.74)
I will keep my cats indoors to reduce bird mortality	259	1	9	6.56 (2.16)
I will contribute money to an organization to preserve birds	296	1	9	6.49 (1.68)
I will tell my family about volunteer and donation projects	296	1	9	6.48 (1.80)
I will volunteer for projects that aim to create bird habitat	294	1	9	6.45 (1.92)

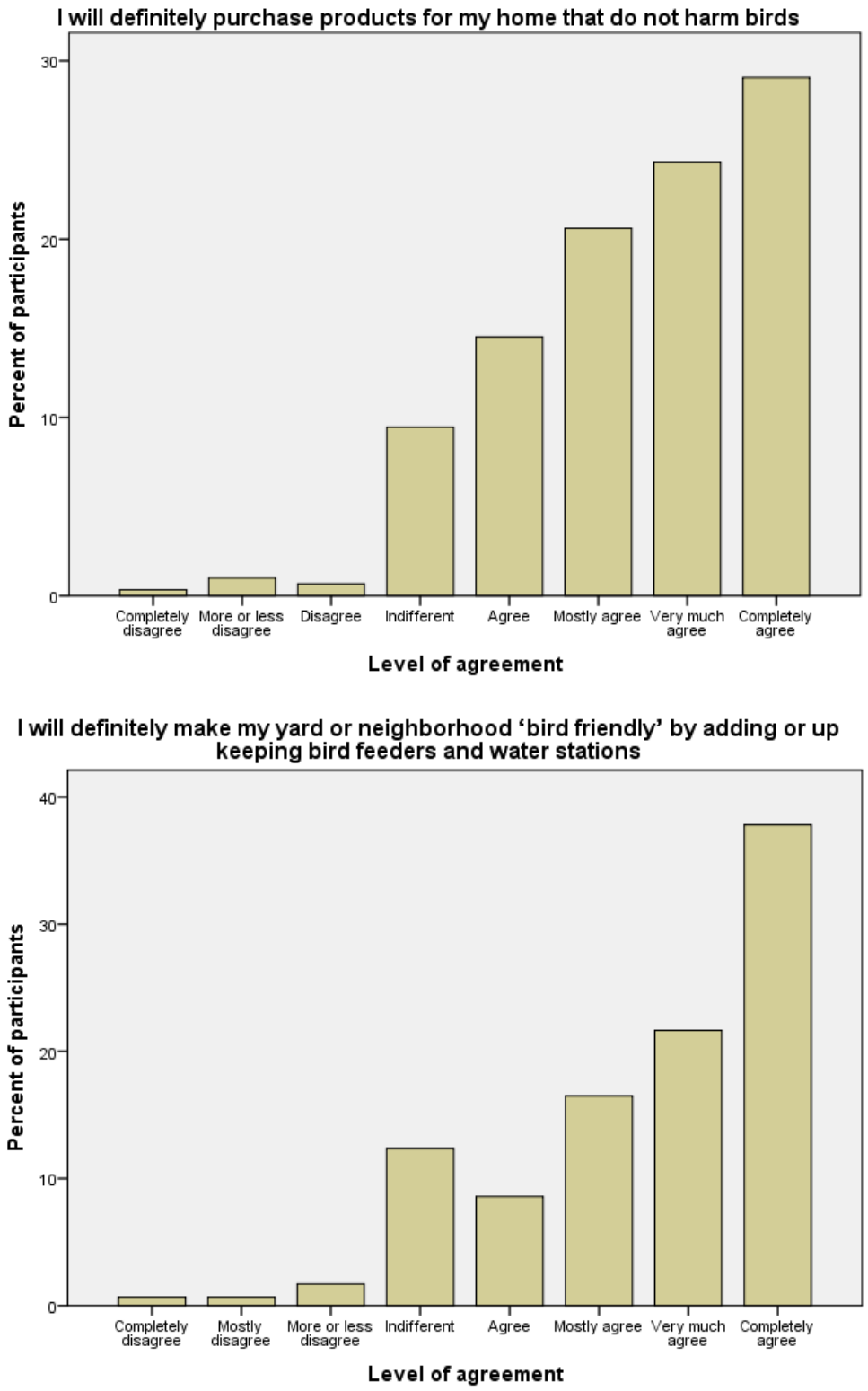


Figure 3.5. Level of agreement with purchasing bird-friendly products (top) and improving yard for birds (bottom).

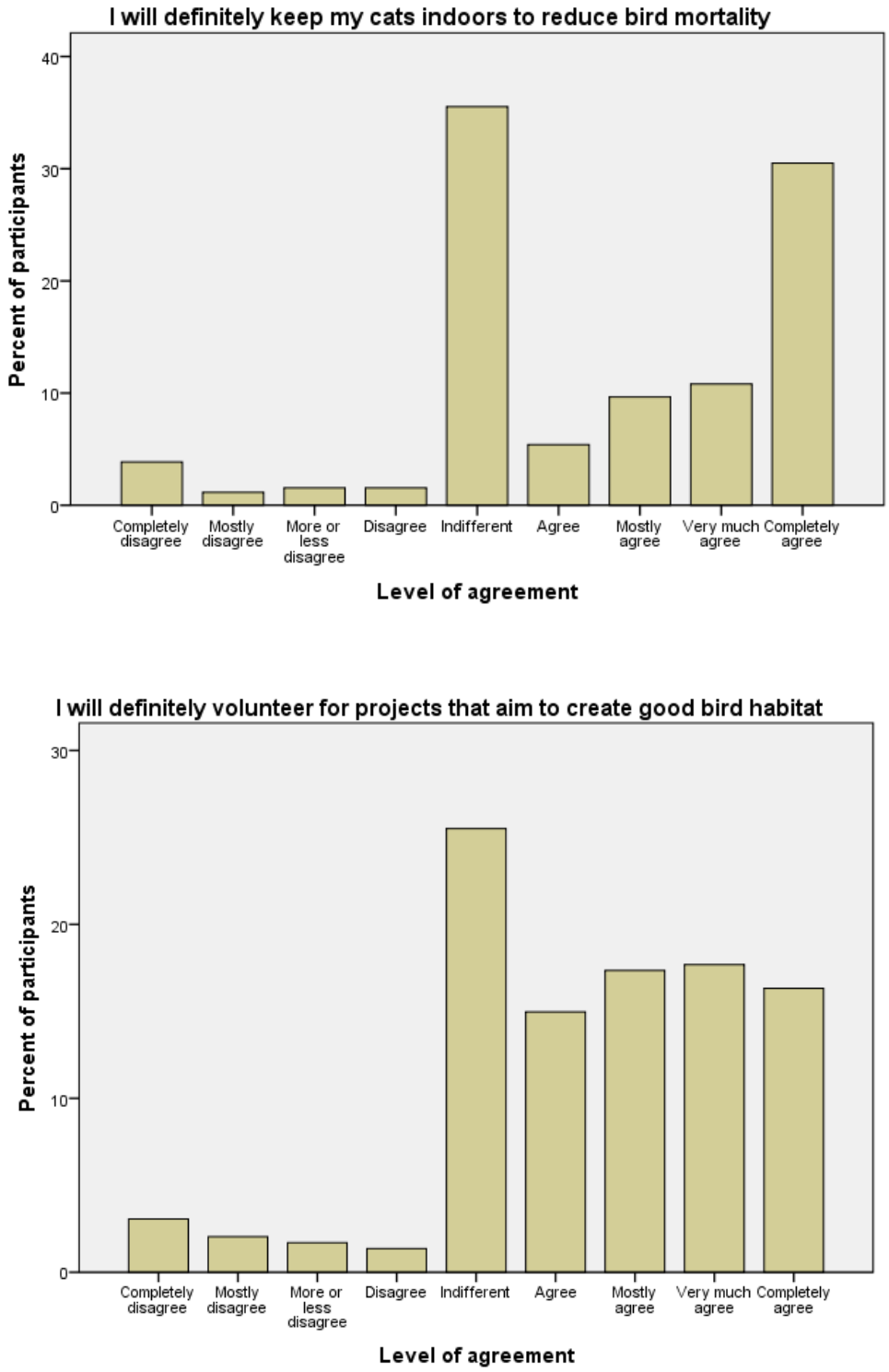


Figure 3.6. Level of agreement to keep cats indoors (top) and volunteer for projects to improve bird habitat (bottom).

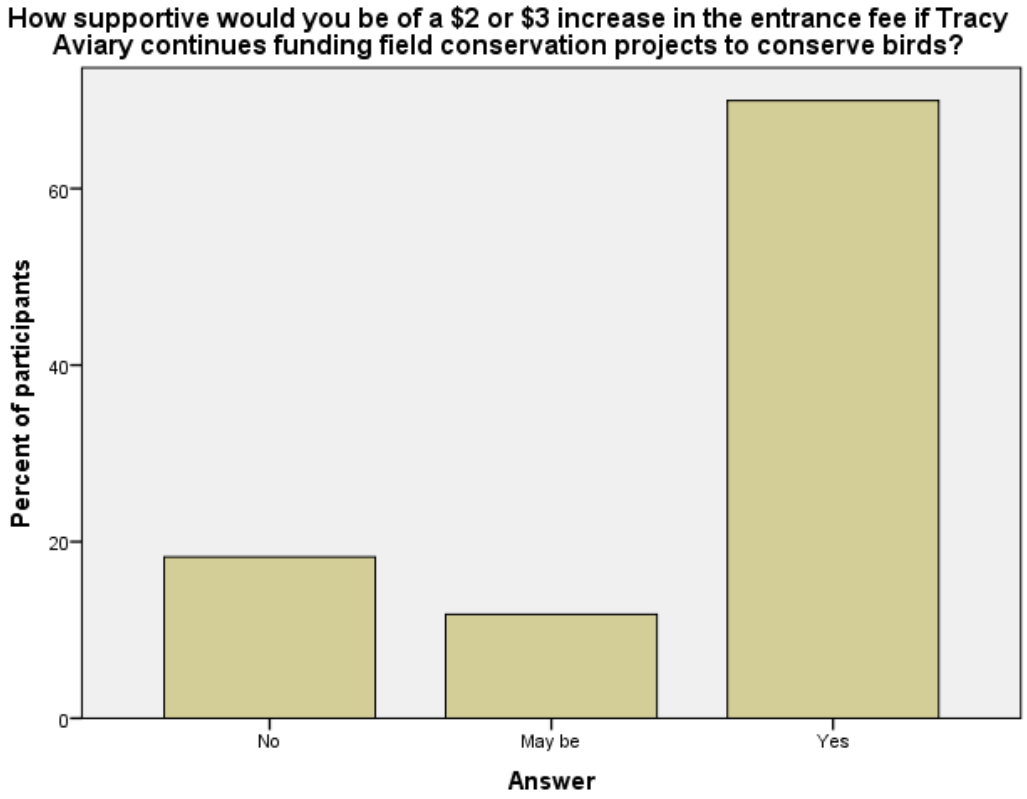


Figure 3.7. Percent visitor support to an increase in Tracy Aviary's entrance fee.

more visible; 2) it is important to include information for visitors to know how their money is spent in conservation projects; and 3) it is important to determine why more of the visitors were not able to vote in the conservation station.

Nonsupporters of a fee increase mentioned that lower income families or families with too many kids could not afford an increase in the entrance fee. Some visitors proposed other methods to raise money for conservation such as voluntary donation.

Project Conclusions

Visitors to Tracy Aviary were mostly first-time visitors with a small percent of them being members for as long as 8 years. The average group size was 3.4 people. White women were predominant in the sample. Approximately half of the visitors to Tracy Aviary were well-educated, represent the middle to upper class, and come to Tracy Aviary to enjoy time with family and friends (strongest motivation to visit), enjoy nature, and learn. The activities that visitors did most included reading exhibits, sitting and relaxing, and interacting with staff. The favorite exhibits were owl forest, Andean condor, flamingos, eagles, and South American Pavilion. Visitors have moderate to high knowledge about basic bird characteristics as well as some of the ecological roles birds play in the ecosystems, yet these results ought to be interpreted with caution. Visitors are likely to purchase bird friendly products and improve yards for birds; the response levels for keeping cats indoors and volunteering / donating for bird and habitat conservation projects were lower. Based on visitors' comments, the role in conservation that Tracy Aviary plays does not seem to be evident. This is reinforced by the fact that only 43% of visitors voted in the conservation station, and from those who voted, none mentioned the existing conservation efforts. Seventy-five percent of the visitors were supportive of a fee increase to support conservation projects and visitors would like to know what projects will be supported and how the money will be allocated. While Tracy Aviary devotes ~ 6% of its budget to conservation, this study helped to reveal that the projects Tracy Aviary conducts and supports are not clear for visitors. In order to make conservation easier to perceive for visitors, more information needs to be disseminated through messaging on-site but also through marketing, our website, and other social media.

CHAPTER 4

REFLECTION ON LEARNING

There are many experiences and persons that contributed to my learning during my M.S. thesis. In this chapter, I discuss the challenges, the lessons I learned conducting this research, and the opportunities to improve based on this experience.

Challenges and Lessons Learned

The M.S. program in Social Sciences with the Department of Parks, Recreation and Tourism opened for me a new door to research in an area I had not been exposed to previously: conservation social science. This complements my background in biology in a unique way; hereafter, I will use parallels between both backgrounds to elaborate on the challenges and learning while conducting this research.

Writing the proposal included various stages: meeting with Tracy Aviary's Senior Management Group to get their input and to identify their most relevant interests and needs, to capture these needs, and to find the balance between the diverse needs of the organization and my research project. This needs assessment was followed by crafting the questionnaire, where I learned to select the most appropriate questions, the importance of asking questions in nonleading ways, and to not prompt undesired answers.

I had not previously used measurement scales to evaluate social constructs (e.g., caring). This was very insightful for me as a form of research and I learned about different scales and used the criteria that in my mind were the most adequate one(s) to align with my research questions used to evaluate a scale's performance.

Studying bird and plant ecology, I had always been able to gather data and to *directly* observe and measure variables like presence or absence of birds, numbers of species present, and types of vegetation. I often use these as proxies to help me interpret larger environmental issues. A difference I found in the social sciences was that human behaviors are complex, not often directly observable (e.g., caring), and that similarly to biology, proxies are needed to reveal and measure social these constructs. Dealing with complex environmental issues and finding accessible solutions for different audiences is where success stems if, as a biologist, I want to positively influence humans to care about and take actions for the nature I study. The research in this thesis allowed me to integrate more comprehensively these two areas - humans and nature.

I learned that both in social and biological research, there will always be unpredictable events that, in spite of all efforts researchers make, cannot be controlled. Initially one can think of this as an imperfection; however, there is value in this imperfection if one considers that as the context is dynamic, research and science also need to be dynamic. For example, during a visit to Tracy Aviary, visitors have their own agendas and assimilate information differently based on their previous experience and knowledge. As much as Tracy Aviary wants visitors to assimilate the information in the way they intend, there is no control over it. Accounting for this and using a good rationale and methods help to address this, and is what makes studies replicable and

improvable in our quest to understand social phenomena.

As an avian researcher, I play the role of observer of birds and plants, interpreting their behaviors and signals. Social sciences rely on the same principles but with humans as the research subjects, and the process of researching humans humbled me for many reasons. First, I had to learn the art of approaching people and the ways in which these approaches bring better, more thoughtful, results. I realized it takes patience, persistence, and interpersonal skills. Second, I learned to deal with people of various backgrounds and to address difficult situations while surveying participants. The data collection process also allowed me to be in contact with the visitors who make Tracy Aviary thrive, while seeing and hearing from them, first hand, their interests and perceptions about birds and Tracy Aviary.

On many occasions, I have been asked to complete surveys in person or over the phone and many times; I avoided those. Reversing the situation, and asking people to complete surveys, showed me that surveying humans is an art form that requires approaching people and getting their approval to participate in the survey willingly and genuinely. While my response rate was probably lower than ideal, I became confident and autonomous in the way I approached people, and could notice growth from the beginning to the end of my data collection process. A big part of this was due to the influence and support of different people from the Aviary and the University.

What I Would Do Different If I Repeated This Research

Methods

When I formulated my research questions, I was more interested in the curiosity that birds and a visit to Tracy Aviary could inspire in visitors than the degree to which people were already curious. People are innately curious, in a higher or lower degree; recognizing this is important and, thus, I would test both state and trait curiosity to have a more holistic approach. I could have measured the conservation intentions more fully by asking visitors informally about intentions they would be willing to perform. I could use such information to create a context-specific scale.

Related to this, I would have had pilot-tested more exhaustively, both the questionnaire and some of the indices I used with visitors and staff. Only after I processed all the data did I realize that some of these did not behave as expected. For example, for level of engagement I used a formative index, but not all the components of the index could be included at the end due to missing responses and poor statistical performance.

Similarly, I would have assigned 5 to 10 days to gather data and simultaneously enter all the data to do preliminary tests to assess its performance and do any required fixes. Entering data showed me that some questions could have been formulated differently to ease the data entry process.

Sampling and Intercepting Visitors

If time allowed, I would have sampled visitors throughout the year, not only during the peak visitation, to capture more of the diversity of the Aviary visitors and

members. Related to this, while I was located at a strategic location to intercept visitors entering and exiting Tracy Aviary, it would have been extremely useful to have a 'play area' for kids of diverse ages and volunteers to help me entertain kids while their parents completed the questionnaire. I only had crayons and coloring pages, but that did not suffice as some kids were too old or too young to use them. When I was by myself, it was difficult to help parents with their kids while intercepting new participants at the same time. Thus, having a wider range of distractions for the kids could have helped both the parents and myself. A good portion of the visitors were parents with kids; I was sensitive to this and realized how hard it is for parents willing to contribute but also needing to supervise kids.

Questionnaire and Contact Form

As a Latina, I was thrilled to see Latinos visit Tracy Aviary; while many of them spoke English well, some did not. Having a Spanish version of the questionnaire could have helped me to better capture this minority that did not speak English. While I helped to translate, I feel that some information was lost in the process and also, I could have intimidated the participants or prompted some answers unintentionally. As the population of Latinos and other cultural groups grow in Utah and the United States, it is necessary to be more inclusive and offer opportunities to diverse audiences. Increasing diversity not only opens opportunities for researchers to understand this diversity, but to account for it framing methods, instruments, and questions that mirror their cultural beliefs, and relation with nature (De la Hoz & Mileham, 2015).

As far as recording participants, when I approached people before they entered

Tracy Aviary and asked them to complete the questionnaire, some said: “I will complete it after I do my visit.” With the large number of people, it was not always easy for me to keep track of all the people who I had asked. Some visitors returned to complete it as they promised, but not always did I factor this in when accounting for refusal numbers. Having a way to better identify the visitors (e.g., giving them a number) in a way that the returnees could be accounted for can provide a more accurate way to estimate the response rate. I thank Skyler Gray for this idea.

While I strived to review data soon after I collected it to match the contact form and the questionnaires, I did not all days. Being strict contrasting the contact form and questionnaire the same day of the sampling saves time and confusion trying to remember after few days.

Data Entry and Analysis

Data entry was an intensive process and would have been easier to do gradually rather than mostly at once, but I completed it successfully. Matt Brownlee, my advisor, was instrumental in setting the database adequately, cleaning the cleaning, and analyzing it. I did learn a great deal and appreciate Matt’s knowledge and dedication to help me with the analysis and guide me through structural modelling, which was fully new to me.

Final Remarks

This project demanded a lot not only from me but everyone involved: my advisor Matt Brownlee, people that helped me administer questionnaires, my colleagues at Tracy Aviary, and the visitors themselves. However, it was fun for the most part and was a very

enlightening process for me. I am hopeful that the information collected will be beneficial to Tracy Aviary and other zoo facilities, and that this could be a springboard for Tracy Aviary to conduct more studies of this kind.

APPENDIX A

QUESTIONNAIRE HANDED TO VISITORS

Visitor opinions about birds and Tracy Aviary

The purpose of this study is to understand Tracy Aviary visitors

with the intent to inform management decisions and improve services.

After you complete this questionnaire, please return it to the field researcher

All responses are confidential and anonymous

Thank you for your cooperation

Conducted by

Researcher use only: Respondent #: _____ Time: _____ Date: _____ Survey Staff: _____

Claimed Discount? _____

Comments_____

Section 1: Past visits

1. Please tell us about *your experiences* at Tracy Aviary.

   a. Including this visit, approximately how times in the last year (12 months) have you visited Tracy Aviary?_____ visits in the last year

   b. Including this year, how many years (total) have you visited Tracy Aviary?

   _____ years

   c. How many hours do you plan to spend at Tracy Aviary today?
   _____ hours

2. Are you a member of Tracy Aviary? ❑ No ❑ Yes For how long? Years ____ Months____

3. How many people are in your group today? _____

4. Are there children (under 18 years old) in your group?

   ❑ No ❑ Yes How many? _____ What are the children's ages? _____

5. Who had the idea to visit Tracy Aviary today?
   _____

Section 2: Activities and motivations to visit

6. Below is a list of activities at the Tracy Aviary. Please indicate the activities you plan to participate in during your visit. (*Check one box for each row*)

During your visit today, do you plan to….

Sit and relax?	❑ No ❑ Yes
Observe the landscape?	❑ No ❑ Yes
Attend a bird show?	❑ No ❑ Yes
Participate in a bird feeding program?	❑ No ❑ Yes Which ones? ❑ Pelican ❑ Duck ❑ Amazon Adventure
Attend a keeper talk?	❑ No ❑ Yes Which ones?
Attend a wetland or stream tour?	❑ No ❑ Yes
Do a self-guided tour?	❑ No ❑ Yes Which ones? ❑ Trees ❑ Hummingbirds' Plants
Interact with Tracy Aviary's staff?	❑ No ❑ Yes
Vote at a conservation station?	❑ No ❑ Yes
Read exhibit signs?	❑ No ❑ Yes
Visit exhibits (*check all those that you plan to visit*)	❑ No ❑ Yes Which ones? ❑ Owl forest ❑ Kennecott Wetlands ❑ Pelican pond ❑ Andean Condor ❑ Eagles ❑ Hornbills ❑ Sandhill Crane ❑ Flamingos ❑ Backyard Birds ❑ South American Pavilion ❑ Rare Birds ❑ King Vulture & Macaw ❑ Hawks & Turkey Vulture ❑ Swans & Ducks
What are three exhibits you would prefer to see?	1. _____2. _____3. _____

7. Below is a list of reasons people visit Tracy Aviary. Please circle the number that indicates how important each reason is to you in relation to your visit today. A rating of -4 means the reason is 'not important at all' and a rating of +4 means the reason is 'extremely important.

Reason to visit Tracy Aviary	**Not Important at all** ←								**Extremely Important** →
Do something with your family and/or friends	-4	-3	-2	-1	0	1	2	3	4
Bring your family and/or friends close together	-4	-3	-2	-1	0	1	2	3	4
Be with people you enjoy	-4	-3	-2	-1	0	1	2	3	4
Learn more about birds	-4	-3	-2	-1	0	1	2	3	4
Study birds	-4	-3	-2	-1	0	1	2	3	4
Gain a better understanding of birds	-4	-3	-2	-1	0	1	2	3	4
Be close to nature	-4	-3	-2	-1	0	1	2	3	4
Enjoy the sounds and smells of nature	-4	-3	-2	-1	0	1	2	3	4
Experience a natural setting	-4	-3	-2	-1	0	1	2	3	4

Section 3: Your feelings about birds

8. Below is a set of statements describing people's curiosity about birds. Please circle the number that indicates your agreement with the following statements. A rating of -4 means you 'completely disagree' with the statement and a rating of +4 means you 'completely agree' with the statement.
(Circle one number for each row).

	Completely disagree ←								**Completely agree** →
I want to know more about birds	-4	-3	-2	-1	0	1	2	3	4
I feel curious about what is happening with birds	-4	-3	-2	-1	0	1	2	3	4
My curiosity about birds is high	-4	-3	-2	-1	0	1	2	3	4
I am really interested in birds	-4	-3	-2	-1	0	1	2	3	4
I feel like seeking information about birds	-4	-3	-2	-1	0	1	2	3	4
Learning about birds is interesting to me	-4	-3	-2	-1	0	1	2	3	4

9. Below is a set of statements describing people's feelings about birds. Please circle the number that indicates your agreement with the following statements. A rating of -4 means you 'completely disagree' with the statement and a rating of +4 means you 'completely agree' with the statement. *(Circle one number for each row).*

	Complety disagree ←								**Completely agree** →
My emotional well-being will be severely diminished if some birds become extinct	-4	-3	-2	-1	0	1	2	3	4
I will alter my lifestyle to protect birds	-4	-3	-2	-1	0	1	2	3	4
My connection to birds increases my love of nature	-4	-3	-2	-1	0	1	2	3	4
Bird protection must be society's highest priority	-4	-3	-2	-1	0	1	2	3	4
I need to learn everything about birds	-4	-3	-2	-1	0	1	2	3	4

Section 4: Potential behaviors

10. Below is a set of actions. Please circle the number that indicates your agreement with the following statements. A rating of -4 means you 'completely disagree' with the statement and a rating of +4 means you 'completely agree' with the statement. *(Circle one number for each row)*

"I definitely will…"	**Completely disagree** ⟷ **Completely agree**								
talk to my family and friends about improving their own conservation behaviors related to birds	-4	-3	-2	-1	0	1	2	3	4
contribute money to an organization seeking donations to preserve birds	-4	-3	-2	-1	0	1	2	3	4
purchase products for my home that do not harm birds	-4	-3	-2	-1	0	1	2	3	4
tell my family about volunteer and donation opportunities related to birds	-4	-3	-2	-1	0	1	2	3	4
keep my cats indoors to reduce bird mortality	-4	-3	-2	-1	0	1	2	3	4
make my yard or neighborhood 'bird friendly' by adding or up keeping bird feeders and water stations	-4	-3	-2	-1	0	1	2	3	4
volunteer for projects that aim to create good bird habitat	-4	-3	-2	-1	0	1	2	3	4

Section 5: Knowledge about birds

11. Below is a set of statements regarding knowledge about birds. Please circle the number that indicates your agreement with the following statements. A rating of -4 means you 'completely disagree' with the statement and a rating of +4 means you 'completely agree' with the statement.
(Circle one number for each row)

	Completely disagree ⟷ **Completely agree**								
I know a lot about birds	-4	-3	-2	-1	0	1	2	3	4
My knowledge about birds is high	-4	-3	-2	-1	0	1	2	3	4
Others see me as an expert regarding birds	-4	-3	-2	-1	0	1	2	3	4
Knowing a lot about birds is who I am	-4	-3	-2	-1	0	1	2	3	4
I understand most things about birds	-4	-3	-2	-1	0	1	2	3	4
My understanding about birds is great	-4	-3	-2	-1	0	1	2	3	4

12. The following questions ask about birds and their conservation.

Check all that apply or answer I do not know:

1. What makes a bird, a bird?
   a) Feathers
   b) Bill
   c) Eggs
   d) Flight
   e) Warm blood
   f) I do not know

2. Which of the following animals are birds?
   a) Ostrich
   b) Parrot
   c) Kiwi
   d) Bat
   e) Pigeon
   f) I do not know

3. Birds are known as:
   a) Pollinators
   b) Seed dispersers
   c) Insect controllers
   d) I do not know

Answer true, false, or I do not know:

1. All birds fly.
   T___ F___ I do not know ___

2. Birds have scales in their feet
   T___ F___ I do not know ___

3. Male and female birds of some species look different
   T___ F___ I do not know ___

4. Birds have hollow bones
   T___ F___ I do not know ___

Fill in the blanks or answer do not know:

1. List 3 threats to the survival of birds
   a) _____
   b) _____
   c) _____
   d) I do not know

Section 6: About you

13. What is your zip code? _____

14. In what year were you born? _____

15. What is your gender? *(check one)* ❑ Male ❑ Female ❑ Other

16. What is the highest level of school you have completed? *(check one)*

❑ Less than high school
❑ Some high school
❑ High school graduate
❑ Some college
❑ Two-year college graduate
❑ Four-year college graduate
❑ Graduate or professional degree

17. What is your race/ethnicity? *(check all that apply)*

❑ American Indian or Alaska Native
❑ Asian
❑ Black or African American
❑ Hawaiian or Pacific Islander
❑ Hispanic or Latino/Latina
❑ White
❑ Other

18. Which category best describes your total household income in U.S. dollars during 2015 before taxes? *(check one)*

❑ Less than $24,999
❑ $25,000 to $34,999
❑ $35,000 to $49,999
❑ $50,000 to $74,999
❑ $75,000 to $99,999
❑ $100,000 t $149,999
❑ $150,000 to $199,999
❑ $200,000 or more
❑ Do not wish to answer

19. Please provide any additional comments about Tracy Aviary.

_____

_____

20. How supportive would you be of a $2 or $3 increase in the entrance fee if Tracy Aviary continues funding field conservation projects to conserve birds? Please explain.

_____

_____

_____

Thank you for your help! If you have questions regarding this study, please contact:
Matthew Brownlee, Ph.D. | matthew.brownlee@hsc.utah.edu | 801-585-7239 | University of Utah

APPENDIX B

MAP OF TRACY AVIARY'S GROUNDS

APPENDIX C

COMMENTS ABOUT A POTENTIAL FEE INCREASE IN THE ENTRANCE TO TRACY AVIARY

How supportive would you be of a $2 or $3 increase in the entrance if Tracy Aviary continues funding field conservation projects to conserve birds? Please explain.

Respondent	Comments
1	Don't' buy a season pass in hopes to spend more money to support birds and conservation efforts
2	Well, your attendance is low, increasing the price will reduce customers which equals no more birds in Utah
3	Yes, I believe it is important to support conservation efforts to help birds and reduce endangered species
4	Possibly 2 or 3; no more than 5
5	Would decrease attendance with large families. Better to increase voluntary donation efforts
6	If it helps, I would be happy for the extra cost
7	Supportive. I am all about conservation
8	As long as the customers know where the money is being sent, it should be fine
9	The membership fee is reasonable; an additional $5 would not be too much
10	I would support this, but show me where it's going? How is it used?
11	Very supportive. I am surprised that the fees are so low for annual passes
12	Depends on the projects
13	My husband and I probably would not have come if it costs much more
14	I would be somewhat supportive as long as Tracy Aviary clearly communicated what the money is being used for
15	Very. $7 vs. $10 is not a huge deal to me and would make me feel more at ease with visiting a place that houses wild animals
16	Supportive. Exhibits are always well maintained. This is not a huge increase
17	Sure! I would only be skeptical if it were over @10
18	Very supportive. 2-3 bucks is nothing when spread overall the members
19	I think the fee is spot on currently
20	No. Make the Aviary affordable to the poor
21	Depends on my experience
22	I am not sure, but an increase is likely, due to rising cost
23	Honestly, it would be hard for family to come at that price because all of us have different income. I like to donate when I can, but raising prices would impact how often I can come

24	I would support a $2-3 increase
25	I am most interested in cheap places so that my family can afford to attend
26	Very supportive if it helps to preserve birds for future generations to enjoy
27	It would be hard on low income families like ours
28	Wonder If people will keep coming?
29	I felt today's was a convenient price
30	I would not be able to afford bringing my large family
31	Very, they need to be able to stay open
32	No. The entrance fee already seems high to many people I talk to
33	With 5 children increases make it less likely that my family will be able to afford to attend
34	I get yearly passes, so it would not affect me. If the yearly passes went up more than $5-10, I probably wouldn't buy them
35	Yes, I would be willing to have an increase
36	If it's really going to that cause I wouldn't mind
37	Very supportive! Is very important to fund projects of this nature
38	Maybe $1.50 but $2 or $3 seems a bit too much
39	Supportive-nature needs help
40	We're not residents-doesn't really affect/apply. Go for it?
41	Yes. Membership seems to be a good price
42	Yes, it would not deter me from coming
43	I would be supportive since there are so many great exhibits & the bird show itself is worth the admission price\
44	We will gladly pay the difference
45	I would support that as a part of an annual membership. But it may be prohibitive for single day passes
46	Not very supportive. Price is quite high for the summer season
47	It's already expensive for us, so not supportive
48	Very. It's part of the deal in my opinion
49	Very supportive. Give more information on where and how funding contributes to conservation
50	Depending on what activities are available, I don’t think people would mind
51	Not sure; since I have never been? Cannot determine if it would be worth it to me
52	I would be ok with it, better if they explain where it is going
53	That's a small amount. Every little bit helps
54	Entrance fee is fairly cheap anyway. So, if more money goes towards bird conservation, it can only be a good thing
55	Not sure; since I have never been? Cannot determine if it would be worth it to me
56	If it contributes to the attractions, yes
57	Don't do it. Instead advertise what you already offer
58	I would support this but I live out of town
59	I would be very supportive of the increase as long as I continue to see additions and improvement to the park
60	Very supportive. In any other city admission would be much higher and potentially not funding anything… may be?
61	I would pay, but some would not be able to afford it with large families

62	I would support but may limit visitors that have limited funds for such events
63	I think more will visit if you keep the price low
64	I would prefer the price stays low so we are able to visit more often for shorter visits
65	I live in Indiana, only come to Utah once a year, I would pay it
66	If it's used to take care of the birds and maybe to educate people about what they can do to protect birds, would be ok with increase
67	Yes! Provided the entry fee increase goes to conservation & education, and you show some sort of breakdown of funds so people see where the money is going
68	I am willing to pay higher prices to ensure the conservation of birds
69	I'd be ok with that. It's an important cause to support
70	I would not mind as far as there are more exhibits
71	Sure. We would pay more for membership too
72	Absolutely, very underpriced
73	I would be supportive-I would also be happy to pay 1/2 price for grandchildren younger than 2-3 years old
74	No problem with entrance increase. Very well worth it!
75	I think you'd best keep process low. I like to keep my expenditures low
76	With 4 kids, it would be hard to pay more for tickets. It would be great to keep conservation donations optional
77	I think is a big help for the Tracy Aviary. I support a lot
78	One thing I enjoy about the Aviary is how affordable it is
79	I would support that, as I imagine the increase will go towards the upkeep
80	Absolutely! What's an extra few dollars to help protect such beautiful creatures :)?
81	Yes if the funding for conservation is part of the initiative
82	Not very supportive. It’s a small space, it seems fair. However I might donate more after entering the door
83	Yes, if it would go toward conservation projects, I would be OK with it
84	Depends, children should be less. Adults possibly could justify an increase
85	I think make the pass for families $5 more. I know families who could not have access with that type of increase. I believe access = conservation
86	I would be willing to support this but for large families this can be prohibitive
87	I'd be ok with it since it goes toward education about nature
88	We may not come as much
89	I'd rather not, especially when I come once a year I bring 6 kids which add up
90	Any more cost is generally seen as negative, but if it is directly related to improving the Aviary, I would support it
91	I would have no problem paying more to contribute to the Aviary further
92	We did not pay this time but $7 seems really reasonable, so $10 is not bad either
93	This seems very reasonable as the prices are lower here than other attractions
94	I totally don't know. But if that increase would help, well do it
95	Wouldn't mind paying more at all
96	I think it would be fine if spent wisely
97	Less inclined to come as often as the size of the Aviary does not warrant a full day here - but $5 (current cost) is reasonable for an hour or two here
98	Okay for me, but keep it lower for children

99	Sounds good-or an extra donation for a pin/something
100	While important, I feel this should be a separate fundraiser. Consider a separate drive at the annual benefit or educating people as they visit. A higher price point at the entrance might discourage visitors, which is not the objective.
101	Not supportive (or senior discount)
102	We only come now when we are able to use our pass of all passes to get free or reduced entrance fees
103	We will continue to support the Aviary even with an increase
104	Would be supportive as long as upgrades/projects were made noticeable. However, an increase would likely lead to us coming less
105	I understand the need but increased lost would limit our attending the Aviary
106	I think lower cost would bring more people
107	Yes, anything to improve the environment for the birds
108	I understand why it would be important but for the family on a budget it would be harder for us to attend
109	It seems it would still be affordable
110	Full support. It is worth every penny!
111	Not supportive at all. I'm a cheapskate
112	I would be very supportive! If people paid a little more upfront, then it will help all birds in the long run
113	Supportive because I am from out of town and would not know about the price difference
114	I would support a $1-2 increase. I believe $3 may keep some potential customers/visitors away
115	Don't know enough to have an educated opinion (first time visitor)
116	I would support an increase in membership dues to help conservation
117	Keeping it under $10 makes it feel inexpensive and worthwhile for even a short visit
118	We would support a $2 increase
119	I think it would be a good idea. I think many people would still come to the Aviary
120	Maybe a $1 or $2 dollar increase
121	Sure, but get kids cheap
122	I would likely buy another membership if so
123	OK. Still a good value for families
124	That doesn't deter me at all. I don't know what the entrance fees are but unless I have 6 kids (which I don't) or I'm a cheapskate (which I'm not) I'm happy to pay a few extra dollars to keep it going
125	Depends on the programs and stats of furthering education for the community
126	I believe this could be fine for people who could afford it, but could exclude people/families with lower SES and unable to afford such increase
127	Very, the fee is too low for how wonderful it is
128	That's fine. We buy season passes
129	I would pay more if more went to conservation. Instead of $1 may $2
130	Reasonable to ask of patrons
131	Give them better home…
132	We would not object it (meaning my view).Would depend on the effect of total admissions
133	Supportive. We buy a yearly pass

134	I would be willing to pay more to protect/care for the birds
135	I would be in support of it, but I think it would discourage a lot of people from coming, so it might be a bad idea
136	We have a year pass, a small increase would not be too bad. However low income families would benefit from access so it would have free/discount days
137	I like that admission is low-It encourages people to come. Many places involving animals are very pricey to get into
138	I would still visit the Aviary to support conservation. Prices rise, it happens
139	Seemed reasonably priced to me; probably wouldn't make a difference in our decision to attend
140	I would still come if the price increased
141	I would definitely support an entry fee increase, and it would be great to show people all the different bird conservation projects that are out there. I love the conservation voting booth
142	That would be fine by me. Still a better price to come here than some other area attracting
143	Yes-worth it-but give special deals to kids and families
144	Have supported in the past; may be willing in the future
145	Very if I knew for certain it was for conservation
146	Supportive, it is worth it
147	We like to come because it is affordable, but worry that an increase might deter people from coming. But if people aren't donating, then I would agree
148	As long as it goes to good cause
149	I would be supportive. Conservation is very important
150	Too high and people won't come to visit!
151	Extra money will keep the aviary a great place. Yes to a $2 increase
152	Supportive but it would be difficult to come as often as I do
153	For adults, but leave kids prices lower
154	I understand that a raise of entrance fees may have to happen to keep the Tracy Aviary open
155	Would be Ok with that amount
156	I wouldn't be supportive on a daily admission. Maybe on yearly passes. The Aviary is becoming more used. I think that would justify the increase
157	Supportive as long as there are programs making Aviary accessible to all economic levels
158	I like that this only cost as much as a movie but if given the option in addition to tickets we probably would have said yes
159	Very supporting. Also support Farmington Bay and Bear River
160	I don't know if I would-It may make it impossible for some people to visit regularly
161	I'd support he increase in entrance fee but only if the extra funds went to conservation directly
162	Okay with the increase as long as it would bring more types of activities or shows
163	I would support it and be willing to pay it
164	Yes. We need to protect and conserve all species
165	Very much. It's a small price for this great facility
166	At $7 a person it would be difficult to frequent the Aviary at much higher cost
167	Probably not. I need low cost things to take my kids to
168	I think that the Aviary could easily require a higher entrance fee
169	No complaints. This place is worth it

170	Not really. There should be options to donate but not an increase in fees
171	If you do this have a prominent exhibit about research topics
172	I think that would discourage visitors as then it may be unaffordable. Keeping admission under $10 keeps the Aviary as an attractive extra-curricular attraction for families
173	I would be ok with it. But I know most people that come here would not
174	I would not mind if the proceeds went to conservation
175	I would support this. I feel the price is really good
176	I wouldn't mind it's pretty cheap
177	I really like the low entrance fee, it sets it apart from other zoo like exhibits
178	Since we have a membership it wouldn't affect us as much but we'd support an increase in order to best take care of the birds and keep aviary moving forward
179	Very. I think it's important to become more aware, protect species and have a good place for family
180	I'd rather contribute directly to specific fund. NOT through a third party
181	Still will come if prices change
182	I have a large family. An increase in entrance would limit how often we would come
183	I would be glad to add an increase in fee
184	I think the price now is fair, and it makes people feel better about making volunteer contributions to the TA
185	Is a reasonable price. Don't increase the price. That way is good for people of low income to bring their kids
186	I prefer it to be voluntary because I can afford it, however others may not be able to. So for example voluntary collections at the bird show or interaction w/feeding animals
187	It would be worth it. It is definitely a good idea
188	Well, we don't have much money and used our pass of all passes for entrance
189	I think there's other ways to collect funds
190	No, no with the economy the way it is. I'd rather spend that money on making my yard bird friendly
191	I would. I worry about families that the additional expense might keep them away. Maybe-added tax like the zoo instead
192	Would likely prohibit bringing my grandchildren or become too expensive
193	I would feel fine but I think it is already cost prohibitive to many who live in the vicinity
194	Very- if needed to keep up and running
195	I'd be very supportive. Many birds/animals are going extinct so it's very important to keep them safe
196	Higher price might limit those able to attend
197	That's fine if it helps the birds
198	Yes. We support all you do for the birds
199	No raise in price without an improvement in park amenities. If the shows were more frequent and drinks were available throughout park and areas to congregate then yes!
200	If it goes to the care of the birds directly, then absolutely I'd support
201	Will maintain annual membership
202	I would fully support this! I have learned to really love birds due to this place
203	Not supportive, but I do support the Zoo Arts and Parks tax
204	Yes, if projects are clearly identified
205	Unsure until we have walked through it

206	Price is not the object, the experience is. An increase is not bothering
207	No. Taxes should pay for these places
208	I'm not sure since I used a connect pass to come, but I'd probably be OK
209	Increase in fee would be OK as long as membership does not become unaffordable

APPENDIX D

COMPILATION OF GENERAL COMMENTS MADE BY

VISITORS TO TRACY AVIARY

Respondent	Other comments
1	I was so impressed with the beautiful planting you have done. So many exhibits have been upgraded. There is a wonderful range of activities for kids. Excellent exhibits.
2	Big. Looks great
3	Great facility! Great staff.
4	Can't wait to visit
5	The birds look so loved. The staff is great. The flowers are amazing.
6	Enjoyed my visit immensely
7	I really like it here, but getting quarters to feed birds was a hassle.
8	The show was a lot of fun. The presenter made me interested to learn more about birds and environmental conservation practices. I enjoy the fun structures around the Aviary as well.
9	Beautiful landscaping
10	It's nice and relaxing
11	Haven't been for years, way better experience this time around
12	Great job guys!
13	We are excited to see updates
14	Excited to see everything
15	This is an important contribution to biology, education
16	Our children always enjoy seeing animals/birds
17	Loved all the exhibits. Very informative and a relaxing environment to enjoy nature
18	Enjoyed the exhibits and really enjoyed the bird show
19	Great to see how much the Aviary has expanded. Loved the gardening as well
20	Love how accessible all the exhibits were
21	Awesome!
22	I loved the friendly and informative environment
23	Thanks. I haven't been here in over 10 years and it is awesome!

24	Love it
25	Excited to have fun & learn
26	I like birds
27	I'm excited to go to learn
28	I am glad we have it in our city
29	I will enjoy the birds
30	Good family friendly place to go
31	I wish there was an Aviary near our home
32	Beautiful and peaceful and informative
33	It was difficult to locate the entrance to the Aviary. Better signage both online and in the park would help
34	Nice facility, well maintained
35	Love the bird show
36	Perfect day; birds were active and staff was helpful. The exhibits are set up nicely and informative
37	We would like to see eagles in the bird show
38	A good work of education
39	Great experience. Thank you
40	Before entering the staff was very helpful and kind. We really appreciate the handicap equipment they provided
41	Found online; visiting Park City. From California, on vacation
42	Original and fantastic place to relax and know more about nature and birds
43	Great staff, clean habitats. I made an unexpected visit to the Tracy Aviary today and found myself pleasantly surprised. Today's visit was my first but will not be my last. I could not be more excited to share this treasure with my two children James and Erin as well as my husband Jeremy. Thank you, really, thank you. Coming to Tracy Aviary was a pleasure. I would like to bring my family to enjoy as well. I also think prices are reasonable, and that giving people more opportunity to donate would be another way to contribute. I fear that increasing admission wouldn't turn people away. So, I agree with increase.
44	A lovely place. Well landscaped and maintained. Clear explanations of exhibits. I did not notice info on the importance of controlling domestic cats in the short time I've lived in Salt Lake City. I've already come across dead birds in my yard, that have been killed by neighbor's cats
45	Seems nice
46	We like the play areas mixed in with the bird exhibits
47	Thank you. First time here in SLC, UT at this amazing park. Just got started with our walking exploration of the park and hope to find many interesting things for the body, mind, and soul.
48	We are excited to visit
49	I am excited to learn and experience something new
50	Beautiful

51	I enjoyed my visit very much. Hope to come back soon
52	They could use some trees in the Rare Birds
53	Cool stuff, man
54	I enjoyed so much, and learned a lot
55	I recommend to put water dispensers throughout the bird exhibition. May be have some children games that 3-18 year olds could participate in. May be a tram that glues history about the birds
56	I really enjoyed it, and the value was great
57	I am excited to visit the Aviary today. I haven't been since I was in elementary school and I am excited to share it with my daughter
58	Love this place, you do a great job
59	List times for feedings at entrance. The staff were all very helpful and smiled! Why wouldn't you? Working in such a beautiful Aviary is a great reason!
60	It was better than the zoo. The restrooms were impressive!
61	Our first visit; loved it!
62	Excellent destination in SLC and very affordable. Maybe in the future…include some warm weather penguins
63	The landscaping was gorgeous. The exhibits were very informative. The whole experience was very enjoyable. It would be great if the Aviary was open later in the summer evenings. It was so pleasant on Monday night!
64	We liked the way Tracy Aviary made for some sections space for rest they are awesome. The quantity of trees, the Monday promotion is a big consideration
65	I loved the sun conures
66	I wanted to spend a quality evening with my daughter. Only day during the week we could come is Monday evening, glad they have an evening option
67	Great improvements
68	It was great! Love the place. However, it is funny to see places w/birds inside or outside when you are outside/inside
69	It is a very nice place to visit with kids and learn
70	Love the improvements
71	My kids love the exhibits! Such a fun day.
72	We had a great experience. Thanks for the upkeep of the park. Thank you
73	I love how ZAP has helped Tracy become better
74	Fun place
75	Its great
76	We love it!
77	Love the remodel
78	Keep up the good work
79	Great experience- we are excited to see it's continued growth

80	It seems like some of the birds have very small cages
81	Need more publicity
82	Super excited! It's our honeymoon!
83	Neat place, I enjoy visiting. As a bird hunter & conservationist, I enjoy birds & seeing & learning about them
84	Thanks
85	Keep up the good work
86	Awesome place! Wish we had one close to where we live
87	Excited to see how its changed
88	Back by stepping stones, need sign stating tall grass blades are sharp and will cut fingers and toes if patrons leave path
89	Great place!
90	Excellent experience
91	I've always enjoyed coming here. Since I was young, it's always been a fun experience. Birds are fun to watch. Their habitats are well taken care of. I feel Tracy Aviary is continuing to expand. It seems I will enjoy it as much as today.
92	Really enjoyed my visit
93	I plan on coming back soon. We were in a hurry today but I look forward to coming when we can spend more time
94	Nice place, good price
95	I haven't been here for about 10 years. It's been changed so much! I still love it here!
96	Enjoy the facility
97	Haven't seen it yet
98	Great place
99	The weather here is hot!
100	Keep up great work
101	It's amazing - I'll be back with friends and more time!
102	We enjoyed it
103	Thanks
104	We had a wonderful day- Beautiful exhibits. Friendly staff
105	I like the recent improvement
106	Excited
107	Came as a kid with my school. Haven't been back in years. But I heard it had been redone and I love learning new things, so we came back
108	Great family trip
109	Nice show-love seeing the birds in action
110	Having hydration stations would be helpful on a hot day
111	Thank you! My kids love it-especially my daughter
112	More water fountains throughout park
113	Love this place!
114	Wonderful experience

115	Love it here!
116	Beautiful. For feeders "We live in Washington where feeders attract bears"
117	Excited to be here today. Haven't been in 20-30 years
118	I was very impressed
119	Very surprising-on how nice it is. Never brought my children here when they were young because it looked run-down from the outside
120	I don’t know too much about it but is a good place to have fun with family
121	Beautiful!
122	I am an ornithologist and avid bird watcher. I am so happy to finally been able to visit the Aviary. Tracy aviary is a great place to enjoy and learn about birds
123	We had so much fun today!
124	Looking forward to seeing variety of birds not seen anywhere else
125	I'm excited to see it
126	Great educational and interactive location for all ages. Highly recommend this attraction to all people
127	No
128	I love the love birds
129	Loved it!
130	Very nice facility
131	It was beautifully landscaped. Really enjoyed the way and the exhibits were set up
132	Thanks, came for music today
133	Loved it!
134	We feel sad and dumb because we didn't realize that the bird show was not at the outdoor bird show arena
135	It was a great first visit!
136	Excellent facility. Would love to see expansion
137	Have to go entertaining 3 year old. Loved playground, need more shade in summer at bird show
138	Looks like a fun place, I’m excited
139	Awesome resource
140	Fun
141	My grandchildren love it so I bring them
142	I love this place. I have great memories here as a kid
143	Great, friendly staff
144	Beautiful
145	My first visit
146	I have loved this place since I was a little boy. I love the improvements that have been made and the care you do for the birds

147	Aesthetically pleasing. Staff seems very nice. Easy to get via the park. Could use more signs for getting in.
148	We're excited to see it!
149	It's a very relaxing environment
150	Very nice. I suggest closing the entrances to bird show as late visitors are annoying and cause disturbance
151	We really enjoyed our first trip
152	This was my first time and I was pleasantly surprised at how interactive... Also very happy with how kid friendly it was with diverse exhibits
153	Love this place
154	Great visit and great exhibits
155	Very clean and informative; not all rare birds were rare
156	It was very fun and a great place to come
157	Easier to find with better signs
158	Thanks for great exhibits, clean displays, fabulous staff, changing a growing aviary with programs for all
159	Some of the exhibits needed more vegetation, especially in the Rare Birds exhibit. But mostly it was a great experience
160	We enjoyed our visit
161	Great place
162	Great place to visit
163	I do falconry
164	Great experience, surprised I never knew about it with the fact I grew up in Utah
165	Recommended for kids to have fun. A pleasant place for them to play
166	Very enjoyable-nice staff
167	Very informative. Great exhibits
168	It has changed a lot since I came here as a young child. I am glad it is still here
169	Well maintained
170	We love that you've made it more family friendly
171	It's been 20 years since I've been here
172	We wish there was place to feed the birds with no time limit. We went to a place like that at the aquarium of the Pacific
173	Bringing baby to her 1st Aviary today :)
174	It's excellent and relaxing; good place to share in family
175	Nice atmosphere, very beautiful, well-appointed
176	Beautiful grounds and fun birds
177	Great renovation
178	The park is beautiful and the water mist fans are brilliant
179	Well improved and upgraded
180	This place is a wonderful place to spend with family

181	Beautiful facility
182	Beautiful settings
183	My older children enjoyed it growing up. We are going to introduce my younger child to it today
184	A pleasant afternoon stroll
185	Enjoyed my visit with my children
186	I wish TA will find a way to take a flock of flamingos to the Great Salt Lake to eat all the brine shrimp (Pink Floyd lasted for years)
187	Beautiful! We loved it!
188	I like the peaceful environment. I should come with my kids
189	Have shows more than once a day :)
190	Loved it. Wish would have known about it sooner. Wish it was open later hours more days
191	Great place would love to see it grow

APPENDIX E

SETTING FOR ADMINISTERING QUESTIONNAIRES AND INTERCEPTING VISITORS AT A STRATEGIC LOCATION. MOTHERS COMPLETING THE QUESTIONNAIRE WHILE THEIR KIDS DREW (BOTTOM PICTURE)

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